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BRAINERD, TEREASA G. A Comparison of Simple Mass Estimators for Galaxy Clusters. *Tereasa G. Brainerd, Candace Oaxaca Wright, David M. Goldberg, & Jens Verner Villumsen.* 524, 9 (1999)

BRAITO, VALENTINA. A Medium Survey of the Hard X-Ray Sky with *ASCA*. II. The Source's Broadband X-Ray Spectral Properties. *Roberto Della Ceca, GianMarco Castelli, Valentina Braito, Ilaria Cagnoni, & Tommaso Maccacaro.* 524, 674 (1999)

BRANCH, D. Evolution of the Light Echo of SN 1991T. *W. B. Sparks, F. Macchetto, N. Panagia, F. R. Boffi, D. Branch, M. L. Hazen, & M. Della Valle.* 523, 585 (1999)

BRANDENBERG, A. Deceleration by Dynamical Friction in a Gaseous Medium. *F. J. Sánchez-Salcedo & A. Brandenberg.* 522, L35 (1999)

BRANDENBURG, AXEL. Time Evolution of the Magnetic Activity Cycle Period. II. Results for an Expanded Stellar Sample. *Steven H. Saar & Axel Brandenburg.* 524, 295 (1999)

BRESOLIN, FABIO. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

BRICENO, C. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

BRIGGS, M. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

BRIGGS, M. S. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*. *M. S. Briggs, D. L. Band, R. M. Kippen, R. D. Preece, C. Kouveliotou, J. van Paradijs, G. H. Share, R. J. Murphy, S. M. Matz, A. Connors, C. Winkler, M. L. McConnell, J. M. Ryan, O. R. Williams, C. A. Young, B. Dingus, J. R. Catelli, & R. A. M. J. Wijers.* 524, 82 (1999)

Evidence for an Early High-Energy Afterglow Observed with BATSE from GRB 980923. *T. W. Giblin, J. van Paradijs, C. Kouveliotou, V. Connaughton, R. A. M. J. Wijers, M. S. Briggs, R. D. Preece, & G. J. Fishman.* 524, L47 (1999)

BRIGGS, MICHAEL S. See MITROFANOV, IGOR G., et al. The Emission Time of Gamma-Ray Bursts.

Average Cosmological Invariant Parameters of Cosmic Gamma-Ray Bursts. *Igor G. Mitrofanov, Dmitrij S. Anfimov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 192 (1999)

Average Emissivity Curve of BATSE Gamma-Ray Bursts with Different Intensities. *Igor G. Mitrofanov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 610 (1999)

BRINKMANN, J. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

BRINKS, E. Neutral Hydrogen (21 Centimeter) Absorption in Seyfert Galaxies: Evidence for Free-Free Absorption and Subkiloparsec Gaseous Disks. *J. F. Gallimore, S. A. Baum, C. P. O'Dea, A. Pedlar, & E. Brinks.* 524, 684 (1999)

BRITTON, M. C. Parallax of PSR J1744−1134 and the Local Interstellar Medium. *M. Toscano, M. C. Britton, R. N. Manchester, M. Bailes, J. S. Sandhu, S. R. Kulkarni, & S. B. Anderson.* 523, L171 (1999)

BROMLEY, BENJAMIN C. Is the Cosmic Microwave Background Really Non-Gaussian? *Benjamin C. Bromley & Max Tegmark.* 524, L79 (1999)

BROSIUS, J. W. Emission Measure Distribution for an Active Region Using Coordinated SERTS and *Yohkoh* SXT Observations. *J. T. Schmelz, J. L. R. Saba, K. T. Strong, H. D. Winter, & J. W. Brosius.* 523, 432 (1999)

BROTHERTON, MICHAEL S. What Determines the Depth of Broad Absorption Lines? Keck HIRES Observations of BALQSO 1603+3002. *Nahum Arav, Robert H. Becker, Sally A. Laurent-Muehleisen, Michael D. Gregg, Richard L. White, Michael S. Brotherton, & Martijn de Kool.* 524, 566 (1999)

BROWN, MICHAEL E. See BURGASSER, ADAM J., et al. Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey.

BRUCATO, J. R. Activation of the 3.4 Micron Band in Carbon Grains by Exposure to Atomic Hydrogen. *V. Mennella, J. R. Brucato, L. Colangeli, & P. Palumbo.* 524, L71 (1999)

BRUECKNER, G. E. Kinematic Measurements of Polar Jets Observed by the Large-Angle Spectrometric Coronagraph. *B. E. Wood, M. Karovska, J. W. Cook, R. A. Howard, & G. E. Brueckner.* 523, 444 (1999)

BRUHWEILER, F. C. *Hubble Space Telescope* Space Telescope Imaging Spectrograph Coronagraphic Imaging of the Herbig AE Star AB Aurigae. *C. A. Grady, B. Woodgate, F. C. Bruhweiler, A. Boggess, Philip Plait, Don J. Lindler, M. Clampin, & P. Kalas.* 523, L151 (1999)

See SAHU, M. S., et al. The D/H Ratio in Interstallar Gas toward G191−B2B.

BRUZUAL, G. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

BUITRAGO, J. Eulerian Perturbative Approximations in Planar Symmetry. *A. P. Raposo, L. J. Goicoechea, & J. Buitrago.* 523, 16 (1999)

BULIK, T. See SANTANGELO, A., et al. A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features.

BULLOCK, J. S. See KOLATT, T. S., et al. Young Galaxies: What Turns Them On?

BUONANNO, R. See ROOD, R. T., et al. The Luminosity Function of M3.

BUREAU, M. Bar Diagnostics in Edge-on Spiral Galaxies. I. The Periodic Orbits Approach. *M. Bureau & E. Athanassoula.* 522, 686 (1999)

Bar Diagnostics in Edge-on Spiral Galaxies. II. Hydrodynamical Simulations. *E. Athanassoula & M. Bureau.* 522, 699 (1999)

BURGASSER, ADAM J. Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey. *Adam J. Burgasser, J. Davy Kirkpatrick, Michael E. Brown, I. Neill Reid, John E. Gizis, Conrad C. Dahn, David G. Monet, Charles A. Beichman, James Liebert, Roc M. Cutri, & Michael F. Skrutskie.* 522, L65 (1999)

BURKERT, ADREAS. On the Formation of Boxy and Disky Elliptical Galaxies. *Thorsten Naab, Adreas Burkert, & Lars Hernquist.* 523, L133 (1999)

BURSTEIN, D. POTENT Reconstruction from Mark III Velocities. *A. Dekel, A. Eldar, T. Kolatt, A. Yahil, J. A. Willick, S. M. Faber, S. Courteau, & D. Burstein.* 522, 1 (1999)

BUSHE, W. K. Small-Scale Interaction of Turbulence with Thermonuclear Flames in Type Ia Supernovae. *J. C. Niemeyer, W. K. Bushe, & G. R. Ruetsch.* 524, 290 (1999)

BUTI, B. Evolution of Nonlinear Alfvén Waves in Streaming Inhomogeneous Plasmas. *B. Buti, V. L. Galinski, V. I. Shevchenko, G. S. Lakhina, B. T. Tsurutani, B. E. Goldstein, P. Diamond, & M. V. Medvedev.* 523, 849 (1999)

BUTLER, MALCOLM. Skyrmion Stars. *Rachid Ouyed & Malcolm Butler.* 522, 453 (1999)

BUTTERWORTH, P. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

CAGNONI, ILARIA. A Medium Survey of the Hard X-Ray Sky with *ASCA*. II. The Source's Broadband X-Ray Spectral Properties. *Roberto Della Ceca, GianMarco Castelli, Valentina Braito, Ilaria Cagnoni, & Tommaso Maccacaro.* 524, 674 (1999)

CALDWELL, J. A. R. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

CALDWELL, R. See MILLER, A. D., et al. A Measurement of the Angular Power Spectrum of the Cosmic Microwave Background from $l = 100$ to 400.

CAMILO, F. The Triple Pulsar System PSR B1620−26 in M4. *S. E. Thorsett, Z. Arzoumanian, F. Camilo, & A. G. Lyne.* 523, 763 (1999)

CAMPANA, S. See SANTANGELO, A., et al. A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features.

CAMPANA, SERGIO. The Brera Multiscale Wavelet *ROSAT* HRI Source Catalog. I. The Algorithm. *Davide Lazzati, Sergio Campana, Piero Rosati, Maria Rosa Panzera, & Gianpiero Tagliaferri.* 524, 414 (1999)

The Brera Multiscale Wavelet *ROSAT* HRI Source Catalog. II. Application to the HRI and First Results. *Sergio Campana, Davide Lazzati, Maria Rosa Panzera, & Gianpiero Tagliaferri.* 524, 423 (1999)

CANUTO, V. M. Turbulence in Stars. III. Unified Treatment of Diffusion, Convection, Semiconvection, Salt Fingers, and Differential Rotation. *V. M. Canuto.* 524, 311 (1999)

CAPPI, MASSIMO. An *RXTE* Observation of NGC 6300: A New Bright Compton Reflection–dominated Seyfert 2 Galaxy. *Karen M. Leighly, Jules Halpern, Hisamitsu Awaki, Massimo Cappi, Shiro Ueno, & Joachim Siebert.* 522, 209 (1999)

CARDELLI, JASON A. The Abundance of Interstellar Tin and Cadmium. *Ulysses J. Sofia, David M. Meyer, & Jason A. Cardelli.* 522, L137 (1999)

CAROLLO, C. MARCELLA. The Centers of Early- to Intermediate-Type Spiral Galaxies: A Structural Analysis. *C. Marcella Carollo.* 523, 566 (1999)

CARPENTER, KENNETH. Toward an Orbit for the High-Luminosity Cepheid T Monocerotis. *Nancy Remage Evans, Kenneth Carpenter, Richard Robinson, Derck Massa, Glenn M. Wahlgren, Jozsef Vinko, & Laszlo Szabados.* 524, 379 (1999)

CARRETTA, E. See ROOD, R. T., et al. The Luminosity Function of M3.

CARRETTA, EUGENIO. An Abundance Analysis for Five Red Horizontal-Branch Stars in the Extremely Metal-rich Globular Cluster NGC 6553. *Judith G. Cohen, Raffaele G. Gratton, Bradford B. Behr, & Eugenio Carretta.* 523, 739 (1999)

CASELLI, P. CO Depletion in the Starless Cloud Core L1544. *P. Caselli, C. M. Walmsley, M. Tafalla, L. Dore, & P. C. Myers.* 523, L165 (1999)

CASINI, R. Spectral Lines for Polarization Measurements of the Coronal Magnetic Field. II. Consistent Treatment of the Stokes Vector for Magnetic-Dipole Transitions. *R. Casini & P. G. Judge.* 522, 524 (1999)

CASTANDER, FRANCISCO J. A Photometric Investigation of the GRB 970228 Afterglow and the Associated Nebulosity. *Francisco J. Castander & Donald Q. Lamb.* 523, 593 (1999)

The Extinction toward the GRB 970228 Field. *Francisco J. Castander & Donald Q. Lamb.* 523, 602 (1999)

CASTELLI, GIANMARCO. A Medium Survey of the Hard X-Ray Sky with *ASCA*. II. The Source's Broadband X-Ray Spectral Properties. *Roberto Della Ceca, GianMarco Castelli, Valentina Braito, Ilaria Cagnoni, & Tommaso Maccacaro.* 524, 674 (1999)

CATELAN, M. Hot Horizontal-Branch Stars: The Ubiquitous Nature of the "Jump" in Strömgren u, Low Gravities, and the Role of Radiative Levitation of Metals. *F. Grundahl, M. Catelan, W. B. Landsman, P. B. Stetson, & M. I. Andersen.* 524, 242 (1999)

CATELLI, J. R. See BRIGGS, M. S., et al. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*.

CAÝON, LAURA. A Look at Three Different Scenarios for Bulge Formation: Erratum. *Rychard Bouwens, Laura Caýon, & Joseph Silk.* 522, 560 (1999) (Orig. paper in 516, 77 (1999))

CEN, RENYUE. The Physical Origin of Scale-dependent Bias in Cosmological Simulations. *Michael Blanton, Renyue Cen, Jeremiah P. Ostriker, & Michael A. Strauss.* 522, 590 (1999)

A Possible Lateral Gamma-Ray Burst Jet from SN 1987A. *Renyue Cen.* 524, L51 (1999)

CHAE, KYU-HYUN. New Modeling of the Lensing Galaxy and Cluster of Q0957+561: Implications for the Global Value of the Hubble Constant. *Kyu-Hyun Chae.* 524, 582 (1999)

CHAFFEE, F. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

CHARBONNEAU, DAVID. An Upper Limit on the Reflected Light from the Planet Orbiting the Star τ Bootis. *David Charbonneau, Robert W. Noyes, Sylvain G. Korzennik, Peter Nihenson, Saurabh Jha, Steven S. Vogt, & Robert I. Kibrick.* 522, L145 (1999)

CHATY, S. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

CHAVUSHYAN, V. H. Radio Emission of Shakhbazian Compact Galaxy Groups. *H. M. Tovmassian, V. H. Chavushyan, O. V. Verkhodanov, & H. Tiersch.* 523, 87 (1999)

CHEN, J. S. The Blue Stragglers in M67 and Single Population Synthesis. *L. Deng, R. Chen, X. S. Liu, & J. S. Chen.* 524, 824 (1999)

CHEN, R. The Blue Stragglers in M67 and Single Population Synthesis. *L. Deng, R. Chen, X. S. Liu, & J. S. Chen.* 524, 824 (1999)

CHERNIN, LAWRENCE M. The HCO^+ Molecular Outflow in NGC 2071. *José M. Girart, Paul T. P. Ho, Alexander L. Rudolph, Robert Estalella, David J. Wilner, & Lawrence M. Chernin.* 522, 921 (1999)

CHIAR, J. E. See GERAKINES, P. A., et al. Observations of Solid Carbon Dioxide in Molecular Clouds with the *Infrared Space Observatory*.

CHIEFFI, A. See ROOD, R. T., et al. The Luminosity Function of M3.

CHIEFFI, ALESSANDRO. Intermediate-Mass Stars: Updated Models. *Inma Dominguez, Alessandro Chieffi, Marco Limongi, & Oscar Straniero.* 524, 226 (1999)

CHIN, CHAO-WEN. The Brightest Supergiants Predicted by Theory. *Richard B. Stothers & Chao-wen Chin.* 522, 960 (1999)

CHOI, BYEON-GAK. Circumstellar Hibonite and Corundum and Nucleosynthesis in Asymptotic Giant Branch Stars. *Byeon-Gak Choi, G. J. Wasserburg, & Gary R. Huss.* 522, L133 (1999)

CHRISTIAN, E. R. See WIEDENBECK, M. E., et al. Constraints on the Time Delay between Nucleosynthesis and Cosmic-Ray Acceleration from Observations of Ni and Co.

CHTCHELKANOVA, A. YU. Jet-induced Explosions of Core Collapse Supernovae. *A. M. Khokhlov, P. A. Höflich, E. S. Oran, J. C. Wheeler, L. Wang, & A. Yu. Chtchelkanova.* 524, L107 (1999)

CLAMPIN, M. *Hubble Space Telescope* Space Telescope Imaging Spectrograph Coronagraphic Imaging of the Herbig AE Star AB Aurigae. *C. A. Grady, B. Woodgate, F. C. Bruhweiler, A. Boggess, Philip Plait, Don J. Lindler, M. Clampin, & P. Kalas.* 523, L151 (1999)

CLAUSSEN, M. J. The Sizes of 1720 MHz OH Masers: VLBA and MERLIN Observations of the Supernova Remnants W44 and W28. *M. J. Claussen, W. M. Goss, D. A. Frail, & K. Desai.* 522, 349 (1999)

CLINE, T. Where Is SGR 1806−20? *K. Hurley, C. Kouveliotou, T. Cline, E. Mazets, S. Golenetskii, D. D. Frederiks, & J. van Paradijs.* 523, L37 (1999)

See HURLEY, K., et al. A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes.

See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

CLINE, T. L. Transient Gamma-Ray Observations of Gamma-Ray Lines from Novae. I. Limits on the Positron Annihilation Line in Five Individual Novae. *M. J. Harris, J. E. Naya, B. J. Teegarden, T. L. Cline, N. Gehrels, D. M. Palmer, R. Ramaty, & H. Seifert.* 522, 424 (1999)

COCCHI, M. A New Bursting X-Ray Transient: SAX J1750.8−2900. *L. Natalucci, R. Cornelisse, A. Bazzano, M. Cocchi, P. Ubertini, J. Heise, J. J. M. in 't Zand, & E. Kuulkers.* 523, L45 (1999)

COHEN, JUDITH G. An Abundance Analysis for Five Red Horizontal-Branch Stars in the Extremely Metal-rich Globular Cluster NGC 6553. *Judith G. Cohen, Raffaele G. Gratton, Bradford B. Behr, & Eugenio Carretta.* 523, 739 (1999)

COKER, ROBERT. Accretion Disk Evolution with Wind Infall. II. Results of Three-dimensional Hydrodynamical Simulations with an Illustrative Application to Sagittarius A*. *Robert Coker, Fulvio Melia, & Heino Falcke.* 523, 642 (1999)

COLANGELI, L. Activation of the 3.4 Micron Band in Carbon Grains by Exposure to Atomic Hydrogen. *V. Mennella, J. R. Brucato, L. Colangeli, & P. Palumbo.* 524, L71 (1999)

COLÍN, PEDRO. Evolution of Bias in Different Cosmological Models. *Pedro Colín, Anatoly A. Klypin, Andrey V. Kravtsov, & Alexei M. Khokhlov.* 523, 32 (1999)

ČONKIĆ, LJ. De-Excitation of ^{180}mTa by ^{60}Co Gamma Rays. *I. Bikit, L. Lakosi, J. Sáfár, & Lj. Čonkić.* 522, 419 (1999)

CONNAUGHTON, V. Evidence for an Early High-Energy Afterglow Observed with BATSE from GRB 980923. *T. W. Giblin, J. van Paradijs, C. Kouveliotou, V. Connaughton, R. A. M. J. Wijers, M. S. Briggs, R. D. Preece, & G. J. Fishman.* 524, L47 (1999)

CONNORS, A. See BRIGGS, M. S., et al. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*.

CONTINI, M. A Multicloud Warm-Absorber Model for NGC 4051. *M. Contini & S. M. Viegas.* 523, 114 (1999)

COOK, J. W. Kinematic Measurements of Polar Jets Observed by the Large-Angle Spectrometric Coronagraph. *B. E. Wood, M. Karovska, J. W. Cook, R. A. Howard, & G. E. Brueckner.* 523, 444 (1999)

COORAY, ASANTHA R. An Upper Limit on Ω_m Using Lensed Arcs. *Asantha R. Cooray.* 524, 504 (1999)

COPPI, P. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

CORCORAN, M. F. Recurrent X-Ray Emission Variations of η Carinae and the Binary Hypothesis. *K. Ishibashi, M. F. Corcoran, K. Davidson, J. H. Swank, R. Petre, S. A. Drake, A. Damineli, & S. White.* 524, 983 (1999)

CORDES, JAMES M. A Search for Pulse-to-Pulse Variability of the Crab Pulsar. *Brian L. Patt, M. P. Ulmer, William Zhang, James M. Cordes, & Z. Arzoumanian.* 522, 440 (1999)

Precession of Isolated Neutron Stars. I. Effects of Imperfect Pinning. *Armen Sedrakian, Ira Wasserman, & James M. Cordes.* 524, 341 (1999)

CORNELISSE, R. A New Bursting X-Ray Transient: SAX J1750.8−2900. *L. Natalucci, R. Cornelisse, A. Bazzano, M. Cocchi, P. Ubertini, J. Heise, J. J. M. in 't Zand, & E. Kuulkers.* 523, L45 (1999)

CORRADI, ROMANO L. M. Jets, Knots, and Tails in Planetary Nebulae: NGC 3918, K1-2, and Wray 17-1. *Romano L. M. Corradi, Mario Perinotto, Eva Villaver, Antonio Mampaso, & Denise R. Gonçalves.* 523, 721 (1999)

COSTA, E. See KULKARNI, S. R., et al. Discovery of a Radio Flare from GRB 990123.

See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

COSTA, J. E. S. Direct Measurement of a Secular Pulsation Period Change in the Pulsating Hot Pre–White Dwarf PG 1159−035. *J. E. S. Costa, S. O. Kepler, & D. E. Winget.* 522, 973 (1999)

COTTON, W. D. B2 1144+35: A Giant Low-Power Radio Galaxy with Superluminal Motion. *G. Giovannini, G. B. Taylor, E. Arbizzani, M. Bondi, W. D. Cotton, L. Feretti, L. Lara, & T. Venturi.* 522, 101 (1999)

COURTEAU, S. POTENT Reconstruction from Mark III Velocities. *A. Dekel, A. Eldar, T. Kolatt, A. Yahil, J. A. Willick, S. M. Faber, S. Courteau, & D. Burstein.* 522, 1 (1999)

COWIE, LENNOX L. An Extremely Luminous Galaxy at $z = 5.74$. *Esther M. Hu, Richard G. McMahon, & Lennox L. Cowie.* 522, L9 (1999)

COX, DONALD P. Modeling W44 as a Supernova Remnant in a Density Gradient with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. I. The Analytical Model. *Donald P. Cox, R. L. Shelton, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Rózyczka.* 524, 179 (1999)

Modeling W44 as a Supernova Remnant in a Density Gradient, with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. II. The Hydrodynamic Models. *R. L. Shelton, Donald P. Cox, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Rózyczka.* 524, 192 (1999)

COX, P. The Molecular Envelope of the Helix Nebula. *K. Young, P. Cox, P. J. Huggins, T. Forveille, & R. Bachiller.* 522, 387 (1999)

CRAIG, I. J. D. Magnetic Reconnection Solutions in the Presence of Multiple Nulls. *I. J. D. Craig, R. B. Fabling, J. Heerikhuisen, & P. G. Watson.* 523, 838 (1999)

CROCKER, J. H. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

CROFT, RUPERT A. C. Closing In on Ω_M: The Amplitude of Mass Fluctuations from Galaxy Clusters and the Lyα Forest. *David H. Weinberg, Rupert A. C. Croft, Lars Hernquist, Neal Katz, & Max Pettini.* 522, 563 (1999)

CSABAI, ISTVÁN. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

CUI, WEI. Phase Lags of Quasi-periodic Oscillations in Microquasar GRS 1915+105. *Wei Cui.* 524, L59 (1999)

CUMMING, ANDREW. The Rapid Proton Process Ashes from Stable Nuclear Burning on an Accreting Neutron Star. *Hendrik Schatz, Lars Bildsten, Andrew Cumming, & Michael Wiescher.* 524, 1014 (1999)

CUMMINGS, A. C. See WIEDENBECK, M. E., et al. Constraints on the Time Delay between Nucleosynthesis and Cosmic-Ray Acceleration from Observations of Ni and Co.

CUNHA, KATIA. Chemical Abundances of OB Stars in the Cepheus OB2 Association. *Simone Daflon, Katia Cunha, & Sylvia R. Becker.* 522, 950 (1999)

CUNTZ, M. Two-Component Theoretical Chromosphere Models for K Dwarfs of Different Magnetic Activity: Exploring the Ca II Emission–Stellar Rotation Relationship. *M. Cuntz, W. Rammacher, P. Ulmschneider, Z. E. Musielak, & S. H. Saar.* 522, 1053 (1999)

CUTRI, ROC M. See BURGASSER, ADAM J., et al. Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey.

DA COSTA, LUIZ N. See FREUDLING, WOLFRAM, et al. Large-Scale Power Spectrum and Cosmological Parameters from SFI Peculiar Velocities.

DAFLON, SIMONE. Chemical Abundances of OB Stars in the Cepheus OB2 Association. *Simone Daflon, Katia Cunha, & Sylvia R. Becker.* 522, 950 (1999)

DAHLBURG, R. B. Relationship of the Multimode Kink Instability to δ-Spot Formation. *M. G. Linton, G. H. Fisher, R. B. Dahlburg, & Y. Fan.* 522, 1190 (1999)

DAHN, CONARD C. A Very Low Luminosity, Very Cool, DC White Dwarf. *Hugh C. Harris, Conard C. Dahn, Frederick J. Vrba, Arne A. Henden, James Liebert, Gary D. Schmidt, & I. Neill Reid.* 524, 1000 (1999)

DAHN, CONRAD C. See BURGASSER, ADAM J., et al. Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey.

DALAL, NEAL. Astrometric Microlensing as a Method of Discovering and Characterizing Extrasolar Planets. *Neda Safizadeh, Neal Dalal, & Kim Griest.* 522, 512 (1999)

DAL FIUME, D. See SANTANGELO, A., et al. A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features.

DALGARNO, A. Rate Coefficients for Ro-vibrational Transitions in H_2 Due to Collisions with He. *N. Balakrishnan, M. Vieira, J. F. Babb, A. Dalgarno, J. F. Forrey, & S. Lepp.* 524, 1122 (1999)

DALLA TORRE, ANDREA. Analysis of the *Hipparcos* Measurements of υ Andromedae: A Mass Estimate of Its Outermost Known Planetary Companion. *Tsevi Mazeh, Shay Zucker, Andrea Dalla Torre, & Floor van Leeuwen.* 522, L149 (1999)

DAMINELI, A. Recurrent X-Ray Emission Variations of η Carinae and the Binary Hypothesis. *K. Ishibashi, M. F. Corcoran, K. Davidson, J. H. Swank, R. Petre, S. A. Drake, A. Damineli, & S. White.* 524, 983 (1999)

D'ANTONA, FRANCESCA. Modeling Lithium-rich Carbon Stars in the Large Magellanic Cloud: An Independent Distance Indicator? *Paolo Ventura, Francesca D'Antona, & Italo Mazzitelli.* 524, L111 (1999)

DAVIDSON, K. Recurrent X-Ray Emission Variations of η Carinae and the Binary Hypothesis. *K. Ishibashi, M. F. Corcoran, K. Davidson, J. H. Swank, R. Petre, S. A. Drake, A. Damineli, & S. White.* 524, 983 (1999)

DAVIS, MARC. A Cepheid Distance to NGC 4603 in Centaurus. *Jeffrey A. Newman, Stephen E. Zepf, Marc Davis, Wendy L. Freedman, Barry F. Madore, Peter B. Stetson, N. Silbermann, & Randy Phelps.* 523, 506 (1999)

Extrapolation of Galactic Dust Emission at 100 Microns to Cosmic Microwave Background Radiation Frequencies Using FIRAS. *Douglas P. Finkbeiner, Marc Davis, & David J. Schlegel.* 524, 867 (1999)

DE BLOK, W. J. G. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

DE GRAAUW, TH. See GERAKINES, P. A., et al. Observations of Solid Carbon Dioxide in Molecular Clouds with the *Infrared Space Observatory*.

DEHNEN, WALTER. The Pattern Speed of the Galactic Bar. *Walter Dehnen.* 524, L35 (1999)

DE JAGER, O. C. A *Rossi X-Ray Timing Explorer* Observation of the Vela Pulsar: Filling in the X-Ray Gap. *M. S. Strickman, A. K. Harding, & O. C. de Jager.* 524, 373 (1999)

DEKEL, A. POTENT Reconstruction from Mark III Velocities. *A. Dekel, A. Eldar, T. Kolatt, A. Yahil, J. A. Willick, S. M. Faber, S. Courteau, & D. Burstein.* 522, 1 (1999)

See KOLATT, T. S., et al. Young Galaxies: What Turns Them On?

DEKEL, AVISHAI. See FREUDLING, WOLFRAM, et al. Large-Scale Power Spectrum and Cosmological Parameters from SFI Peculiar Velocities.

DE KOOL, MARTIJN. What Determines the Depth of Broad Absorption Lines? Keck HIRES Observations of BALQSO 1603+3002. *Nahum Arav, Robert H. Becker, Sally A. Laurent-Muehleisen, Michael D. Gregg, Richard L. White, Michael S. Brotherton, & Martijn de Kool.* 524, 566 (1999)

DELEMARTER, GUY. Ambipolar Diffusion in Young Stellar Object Jets. *Adam Frank, Thomas A. Gardiner, Guy Delemarter, Thibaut Lery, & Riccardo Betti.* 524, 947 (1999)

DELLA CECA, ROBERTO. A Medium Survey of the Hard X-Ray Sky with *ASCA*. II. The Source's Broadband X-Ray Spectral Properties. *Roberto Della Ceca, GianMarco Castelli, Valentina Braito, Ilaria Cagnoni, & Tommaso Maccacaro.* 524, 674 (1999)

DELLA VALLE, M. Evolution of the Light Echo of SN 1991T. *W. B. Sparks, F. Macchetto, N. Panagia, F. R. Boffi, D. Branch, M. L. Hazen, & M. Della Valle.* 523, 585 (1999)

DENG, L. The Blue Stragglers in M67 and Single Population Synthesis. *L. Deng, R. Chen, X. S. Liu, & J. S. Chen.* 524, 824 (1999)

DENG, M. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

DENG, Z.-G. The Nature of the Diffuse Clumps and the X-Ray Companion of Markarian 273. *X.-Y. Xia, S. Mao, H. Wu, X.-W. Liu, Y. Gao, Z.-G. Deng, & Z.-L. Zou.* 524, 746 (1999)

DENG, ZUGAN. Abundances and Correlations of Structures beyond Galaxy Clusters. *Wen Xu, Li-Zhi Fang, & Zugan Deng.* 524, 1 (1999)

DEPOY, D. L. See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

DESAI, K. The Sizes of 1720 MHz OH Masers: VLBA and MERLIN Observations of the Supernova Remnants W44 and W28. *M. J. Claussen, W. M. Goss, D. A. Frail, & K. Desai.* 522, 349 (1999)

DESERT, F. X. An *Infrared Space Observatory* Upper Limit to the Low-Mass Star Halo in the Edge-on Galaxy NGC 4565. *Charles Beichman, George Helou, Dave Van Buren, Ken Ganga, & F. X. Desert.* 523, 559 (1999)

DESHPANDE, AVINASH A. Pulsar Magnetospheric Emission Mapping: Images and Implications of Polar Cap Weather. *Avinash A. Deshpande & Joanna M. Rankin.* 524, 1008 (1999)

DEUTSCH, ERIC W. Infrared Candidates for the Intense Galactic X-Ray Source GX 17+2. *Eric W. Deutsch, Bruce Margon, Scott F. Anderson, Stefanie Wachter, & W. M. Goss.* 524, 406 (1999)

DEVLIN, M. J. See MILLER, A. D., et al. A Measurement of the Angular Power Spectrum of the Cosmic Microwave Background from $l = 100$ to 400.

DIAMOND, P. Evolution of Nonlinear Alfvén Waves in Streaming Inhomogeneous Plasmas. *B. Buti, V. L. Galinski, V. I. Shevchenko, G. S. Lakhina, B. T. Tsurutani, B. E. Goldstein, P. Diamond, & M. V. Medvedev.* 523, 849 (1999)

DIAZ, MARCOS P. The Eclipsing Cataclysmic Variable V347 Puppis Revisited. *Marcos P. Diaz & Hubeny Ivan.* 523, 786 (1999)

DI MATTEO, TIZIANA. Low-Luminosity States of the Black Hole Candidate GX 339−4. I. *ASCA* and Simultaneous Radio/*RXTE* Observations. *Jörn Wilms, Michael A. Nowak, James B. Dove, Robert P. Fender, & Tiziana Di Matteo.* 522, 460 (1999)

DINGUS, B. See BRIGGS, M. S., et al. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*.

DISNEY, M. J. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

DJORGOVSKI, S. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

DJORGOVSKI, S. G. See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

DMITRUK, P. Coronal Heating by Magnetohydrodynamic Turbulence Driven by Reflected Low-Frequency Waves. *W. H. Matthaeus, G. P. Zank, S. Oughton, D. J. Mullan, & P. Dmitruk.* 523, L93 (1999)

DOMÍNGUEZ, ALVARO. The Fractal Distribution of Galaxies and the Transition to Homogeneity. *José Gaite, Alvaro Domínguez, & Juan Pérez-Mercader.* 522, L5 (1999)

DOMINGUEZ, INMA. Intermediate-Mass Stars: Updated Models. *Inma Dominguez, Alessandro Chieffi, Marco Limongi, & Oscar Straniero.* 524, 226 (1999)

DOMINIK, M. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

DONAHUE, MEGAN. Ω_m from the Temperature-Redshift Distribution of EMSS Clusters of Galaxies. *Megan Donahue & G. Mark Voit.* 523, L137 (1999)

DORBAND, J. E. The [N II] Kinematics of R Aquarii. *J. M. Hollis, S. N. Vogel, D. Van Buren, J. P. Strong, R. G. Lyon, & J. E. Dorband.* 522, 297 (1999)

DORE, L. CO Depletion in the Starless Cloud Core L1544. *P. Caselli, C. M. Walmsley, M. Tafalla, L. Dore, & P. C. Myers.* 523, L165 (1999)

DORMAN, B. See ROOD, R. T., et al. The Luminosity Function of M3.

DORMAN, BEN. Blue Straggler Stars: The Spectacular Population in M80. *Francesco R. Ferraro, Barbara Paltrinieri, Robert T. Rood, & Ben Dorman.* 522, 983 (1999)

DORWART, W. B. See MILLER, A. D., et al. A Measurement of the Angular Power Spectrum of the Cosmic Microwave Background from $l = 100$ to 400.

DOTANI, T. On the Spin History of the X-Ray Pulsar in Kes 73: Further Evidence for an Ultramagnetized Neutron Star. *E. V. Gotthelf, G. Vasisht, & T. Dotani.* 522, L49 (1999)

Detection of Hard X-Rays from a Class I Protostar in the HH 24-26 Region in the Orion Molecular Cloud. *H. Ozawa, F. Nagase, Y. Ueda, T. Dotani, & M. Ishida.* 523, L81 (1999)

DOTANI, TADAYASU. Spin-down of the 65 Millisecond X-Ray Pulsar in the Supernova Remnant G11.2−0.3. *Ken'ichi Torii, Hiroshi Tsunemi, Tadayasu Dotani, Kazuhisa Mitsuda, Nobuyuki Kawai, Kenzo Kinugasa, Yoshitaka Saito, & Shinpei Shibata.* 523, L69 (1999)

DOUBLIER, V. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

DOUGHERTY, B. L. See WIEDENBECK, M. E., et al. Constraints on the Time Delay between Nucleosynthesis and Cosmic-Ray Acceleration from Observations of Ni and Co.

DOVE, JAMES B. Low-Luminosity States of the Black Hole Candidate GX 339−4. I. *ASCA* and Simultaneous Radio/*RXTE* Observations. *Jörn Wilms, Michael A. Nowak, James B. Dove, Robert P. Fender, & Tiziana Di Matteo.* 522, 460 (1999)

DOWNES, D. Gasdynamics in the Luminous Merger NCG 6240. *L. J. Tacconi, R. Genzel, M. Tecza, J. F. Gallimore, D. Downes, & N. Z. Scoville.* 524, 732 (1999)

DRAKE, JEREMY J. On X-Ray Variability in Active Binary Stars. *Vinay Kashyap & Jeremy J. Drake.* 524, 988 (1999)

DRAKE, S. A. Recurrent X-Ray Emission Variations of η Carinae and the Binary Hypothesis. *K. Ishibashi, M. F. Corcoran, K. Davidson, J. H. Swank, R. Petre, S. A. Drake, A. Damineli, & S. White.* 524, 983 (1999)

DUBUC, A. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

DULEY, W. W. 2175 Å and 3.4 Micron Absorption Bands and Carbon Depletion in the Diffuse Interstellar Medium. *W. W. Duley & S. S. Seahra.* 522, L129 (1999)

DUNCAN, ROBERT C. See WOODS, PETER M., et al. Variable Spin-down in the Soft Gamma Repeater SGR 1900+14 and Correlations with Burst Activity.

DWEK, ELI. Analytical Approximations for Calculating the Escape and Absorption of Radiation in Clumpy Dusty Environments. *Frank Városi & Eli Dwek.* 523, 265 (1999)

EARL, MATTHEW. An Analysis of 17 Years of *Voyager* Observations of the Diffuse Far-Ultraviolet Radiation Field. *Jayant Murthy, Doyle Hall, Matthew Earl, R. C. Henry, & J. B. Holberg.* 522, 904 (1999)

EASTLUND, B. J. Beams and Cones from Aligned Rotators. *B. J. Eastlund & B. Miller.* 523, L41 (1999)

ECKART, A. The Molecular Gas in the Circumnuclear Region of Seyfert Galaxies. *E. Schinnerer, A. Eckart, & L. J. Tacconi.* 524, L5 (1999)

ECKART, ANDREAS. Variable and Embedded Stars in the Galactic Center. *Thomas Ott, Andreas Eckart, & Reinhard Genzel.* 523, 248 (1999)

EHRENFREUND, P. See GERAKINES, P. A., et al. Observations of Solid Carbon Dioxide in Molecular Clouds with the *Infrared Space Observatory*.

EKERS, R. D. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

ELDAR, A. POTENT Reconstruction from Mark III Velocities. *A. Dekel, A. Eldar, T. Kolatt, A. Yahil, J. A. Willick, S. M. Faber, S. Courteau, & D. Burstein.* 522, 1 (1999)

ELDAR, AMIRAM. See FREUDLING, WOLFRAM, et al. Large-Scale Power Spectrum and Cosmological Parameters from SFI Peculiar Velocities.

ELLMAN, N. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

ELMEGREEN, BRUCE G. Reflection of Bulge Light from a 2 Kiloparsec Segment of Dust Lane in the Galaxy NGC 2841. *David L. Block, Alan Stockton, Bruce G. Elmegreen, & Jon Willis.* 522, L25 (1999)

A Prediction of Brown Dwarfs in Ultracold Molecular Gas. *Bruce G. Elmegreen.* 522, 915 (1999)

EMMET, W. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

ENDO, TAKAO. Discovery of 715 Second Pulsations from the Faint X-Ray Source AX J170006−4157. *Ken'ichi Torii, Mutsumi Sugizaki, Takayoshi Kohmura, Takao Endo, & Fumiaki Nagase.* 523, L65 (1999)

ENDT, PIETER M. Explosive Hydrogen Burning of ^{27}Si, ^{31}S, ^{35}Ar, and ^{39}Ca in Novae and X-Ray Bursts. *Christian Iliadis, Pieter M. Endt, Nikos Prantzos, & William J. Thompson.* 524, 434 (1999)

ERACLEOUS, MICHAEL. Discovery of a Hard X-Ray Source, SAX J0635+0533, in the Error Box of the Gamma-Ray Source 2EG 0635+0521. *Philip Kaaret, Santina Piraino, Jules Halpern, & Michael Eracleous.* 523, 197 (1999)

ESTALELLA, ROBERT. The HCO^+ Molecular Outflow in NGC 2071. *José M. Girart, Paul T. P. Ho, Alexander L. Rudolph, Robert Estalella, David J. Wilner, & Lawrence M. Chernin.* 522, 921 (1999)

EVANS, NANCY REMAGE. Toward an Orbit for the High-Luminosity Cepheid T Monocerotis. *Nancy Remage Evans, Kenneth Carpenter, Richard Robinson, Derck Massa, Glenn M. Wahlgren, Jozsef Vinko, & Laszlo Szabados.* 524, 379 (1999)

EVANS, NEAL J., II. The Impact of the Massive Young Star GL 2591 on Its Circumstellar Material: Temperature, Density, and Velocity Structure. *Floris F. S. van der Tak, Ewine F. van Dishoeck, Neal J. Evans II, Eric J. Bakker, & Geoffrey A. Blake.* 522, 991 (1999)

FABER, S. M. POTENT Reconstruction from Mark III Velocities. *A. Dekel, A. Eldar, T. Kolatt, A. Yahil, J. A. Willick, S. M. Faber, S. Courteau, & D. Burstein.* 522, 1 (1999)

See KOLATT, T. S., et al. Young Galaxies: What Turns Them On?

FABLING, R. B. Magnetic Reconnection Solutions in the Presence of Multiple Nulls. *I. J. D. Craig, R. B. Fabling, J. Heerikhuisen, & P. G. Watson.* 523, 838 (1999)

FALCKE, HEINO. Detection of Circular Polarization in the Galactic Center Black Hole Candidate Sagittarius A*. *Geoffrey C. Bower, Heino Falcke, & Donald C. Backer.* 523, L29 (1999)

Accretion Disk Evolution with Wind Infall. II. Results of Three-dimensional Hydrodynamical Simulations with an Illustrative Application to Sagittarius A*. *Robert Coker, Fulvio Melia, & Heino Falcke.* 523, 642 (1999)

FALCO, E. E. Dust and Extinction Curves in Galaxies with $z > 0$: The Interstellar Medium of Gravitational Lens Galaxies. *E. F. Falco, C. D. Impey, C. S. Kochanek, J. Lehár, B. A. McLeod, H.-W. Rix, C. R. Keeton, J. A. Muñoz, & C. Y Peng.* 523, 617 (1999)

See PENG, C. Y., et al. The Quasar Pair Q1634+267A,B and the Binary QSO versus Dark Lens Hypotheses.

FALL, S. MICHAEL. Cosmic Histories of Stars, Gas, Heavy Elements, and Dust in Galaxies. *Yichuan C. Pei, S. Michael Fall, & Michael G. Hauser.* 522, 604 (1999)

FALOMO, R. See WIJERS, R. A. M. J., et al. Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope.

FAN, XIAOHUI. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

FAN, Y. Relationship of the Multimode Kink Instability to δ-Spot Formation. *M. G. Linton, G. H. Fisher, R. B. Dahlburg, & Y. Fan.* 522, 1190 (1999)

FANG, LI-ZHI. The Flatness of the Mass-to-Light Ratio on Large Scales. *Li-Zhi Fang & Wen Xu.* 522, L85 (1999)

Abundances and Correlations of Structures beyond Galaxy Clusters. *Wen Xu, Li-Zhi Fang, & Zugan Deng.* 524, 1 (1999)

The L_X-T and L_X-σ Relationships for Galaxy Clusters Revisited. *Xiang-Ping Wu, Yan-Jie Xue, & Li-Zhi Fang.* 524, 22 (1999)

FARRELL, BRIAN F. Optimal Excitation of Magnetic Fields. *Brian F. Farrell & Petros J. Ioannou.* 522, 1079 (1999)

Stochastic Dynamics of Field Generation in Conducting Fluids. *Brian F. Farrell & Petros J. Ioannou.* 522, 1088 (1999)

FEDCHAK, J. A. Absolute UV and Vacuum UV Oscillator Strengths for Ni II. *J. A. Fedchak & J. E. Lawler.* 523, 734 (1999)

FEGGANS, K. See SAHU, M. S., et al. The D/H Ratio in Interstallar Gas toward G191−B2B.

FELDMAN, U. Morphology of the Quiet Solar Upper Atmosphere in the $4 \times 10^4 < T_e < 1.4 \times 10^6$ K Temperature Regime. *U. Feldman, K. G. Widing, & H. P. Warren.* 522, 1133 (1999)

FENDER, ROBERT P. Low-Luminosity States of the Black Hole Candidate GX 339−4. I. *ASCA* and Simultaneous Radio/*RXTE* Observations. *Jörn Wilms, Michael A. Nowak, James B. Dove, Robert P. Fender, & Tiziana Di Matteo.* 522, 460 (1999)

FENIMORE, E. E. Statistical Analysis of Spectral Line Candidates in Gamma-Ray Burst GRB 870303. *P. E. Freeman, C. Graziani, D. Q. Lamb, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 753 (1999)

Resonant Cyclotron Radiation Transfer Model Fits to Spectra from Gamma-Ray Burst GRB 870303. *P. E. Freeman, D. Q. Lamb, J. C. L. Wang, I. Wasserman, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 772 (1999)

FERETTI, L. B2 1144+35: A Giant Low-Power Radio Galaxy with Superluminal Motion. *G. Giovannini, G. B. Taylor, E. Arbizzani, M. Bondi, W. D. Cotton, L. Feretti, L. Lara, & T. Venturi.* 522, 101 (1999)

FERLAND, GARY J. *Hubble Space Telescope*/Faint Object Spectrograph Spectroscopy of Spatially Resolved Narrow-Line Regions in the Seyfert 2 Galaxies NGC 2110 and NGC 5929. *Pierre Ferruit, Andrew S. Wilson, Mark Whittle, Chris Simpson, John S. Mulcahey, & Gary J. Ferland.* 523, 147 (1999)

FERNÁNDEZ-SOTO, A. The Gaseous Extent of Galaxies and the Origin of Lyα Absorption Systems. IV. Lyα Absorbers Arising in a Galaxy Group. *A. Ortiz-Gill, K. M. Lanzetta, J. K. Webb, X. Barcons, & A. Fernández-Soto.* 523, 72 (1999)

FEROCI, M. See KULKARNI, S. R., et al. Discovery of a Radio Flare from GRB 990123.

See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

FERRARESE, LAURA. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

FERRARO, F. R. See ROOD, R. T., et al. The Luminosity Function of M3.

FERRARO, FRANCESCO R. Blue Straggler Stars: The Spectacular Population in M80. *Francesco R. Ferraro, Barbara Paltrinieri, Robert T. Rood, & Ben Dorman.* 522, 983 (1999)

ROSAT HRI X-Ray Observations of the Open Globular Cluster NGC 288. *Craig L. Sarazin, Jimmy A. Irwin, Robert T. Rood, Francesco R. Ferraro, & Barbara Paltrinieri.* 524, 220 (1999)

FERRIN, I. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

FERRUIT, PIERRE. *Hubble Space Telescope*/Faint Object Spectrograph Spectroscopy of Spatially Resolved Narrow-Line Regions in the Seyfert 2 Galaxies NGC 2110 and NGC 5929. *Pierre Ferruit, Andrew S. Wilson, Mark Whittle, Chris Simpson, John S. Mulcahey, & Gary J. Ferland.* 523, 147 (1999)

FICH, MICHEL. Star Formation in the Giant H II Regions of M101. *Jean Giannakopoulou-Creighton, Michel Fich, & Christine D. Wilson.* 522, 238 (1999)

FINGER, MARK H. See WOODS, PETER M., et al. Variable Spin-down in the Soft Gamma Repeater SGR 1900+14 and Correlations with Burst Activity.

FINKBEINER, DOUGLAS P. Extrapolation of Galactic Dust Emission at 100 Microns to Cosmic Microwave Background Radiation Frequencies Using FIRAS. *Douglas P. Finkbeiner, Marc Davis, & David J. Schlegel.* 524, 867 (1999)

FIRTH, E. See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

FISHER, G. H. Relationship of the Multimode Kink Instability to δ-Spot Formation. *M. G. Linton, G. H. Fisher, R. B. Dahlburg, & Y. Fan.* 522, 1190 (1999)

FISHMAN, G. J. See HURLEY, K., et al. A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes.

Evidence for an Early High-Energy Afterglow Observed with BATSE from GRB 980923. *T. W. Giblin, J. van Paradijs, C. Kouveliotou, V. Connaughton, R. A. M. J. Wijers, M. S. Briggs, R. D. Preece, & G. J. Fishman.* 524, L47 (1999)

FISHMAN, GERALD J. See MITROFANOV, IGOR G., et al. The Emission Time of Gamma-Ray Bursts.

FLINT, K. P. A Study of Lyα Quasar Absorbers in the Nearby Universe. *C. D. Impey, C. E. Petry, & K. P. Flint.* 524, 536 (1999)

FLORINSKI, V. A Two-dimensional, Self-consistent Model of Galactic Cosmic Rays in the Heliosphere. *V. Florinski & J. R. Jokipii.* 523, L185 (1999)

FOCKENBROCK, R. See THOMPSON, D., et al. The Surface Density of Extremely Red Objects.

FOLKMANN, F. Measurement of the Absolute Photoionization Cross Section of C^+ near Threshold. *H. Kjeldsen, F. Folkmann, J. E. Hansen, H. Knudsen, M. S. Rasmussen, J. B. West, & T. Andersen.* 524, L143 (1999)

FORD, HOLLAND C. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

FORREST, W. J. Fe II Bubbles in the Young Planetary Nebula Hubble 12. *Charles A. Welch, A. Frank, Judith L. Pipher, W. J. Forrest, & Charles E. Woodward.* 522, L69 (1999)

FORREY, J. F. Rate Coefficients for Ro-vibrational Transitions in H_2 Due to Collisions with He. *N. Balakrishnan, M. Vieira, J. F. Babb, A. Dalgarno, J. F. Forrey, & S. Lepp.* 524, 1122 (1999)

FORSTER, KARL. The X-Ray Spectra and Spectral Variability of Intermediate-Type Seyfert Galaxies: *ASCA* Observations of NGC 4388 and ESO 103−G35. *Karl Forster, Karen M. Leighly, & Laura E. Kay.* 523, 521 (1999)

FORVEILLE, T. The Molecular Envelope of the Helix Nebula. *K. Young, P. Cox, P. J. Huggins, T. Forveille, & R. Bachiller.* 522, 387 (1999)

FOX, P. A. Joint Instability of Latitudinal Differential Rotation and Toroidal Magnetic Fields below the Solar Convection Zone. III. Unstable Disturbance Phenomenology and the Solar Cycle. *P. A. Gilman & P. A. Fox.* 522, 1167 (1999)

FRAGILE, P. C. See RHIE, S. H., et al. Observations of the Binary Microlens Event MACHO 98-SMC-1 by the Microlensing Planet Search Collaboration.

FRAIL, D. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

FRAIL, D. A. The Sizes of 1720 MHz OH Masers: VLBA and MERLIN Observations of the Supernova Remnants W44 and W28. *M. J. Claussen, W. M. Goss, D. A. Frail, & K. Desai.* 522, 349 (1999)

See KULKARNI, S. R., et al. Discovery of a Radio Flare from GRB 990123.

See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

FRANCO, JOSÉ. The Kinematics of Stars Emerging from Expanding Shells: An Analysis of the Gould Belt. *Edmundo Moreno, Emilio J. Alfaro, & José Franco.* 522, 276 (1999)

Superbubble Evolution Including the Star-forming Clouds: Is It Possible to Reconcile Large Magellanic Cloud Observations with Model Predictions? *Sergei Silich & José Franco.* 522, 863 (1999)

FRANK, A. Fe II Bubbles in the Young Planetary Nebula Hubble 12. *Charles A. Welch, A. Frank, Judith L. Pipher, W. J. Forrest, & Charles E. Woodward.* 522, L69 (1999)

FRANK, ADAM. Ambipolar Diffusion in Young Stellar Object Jets. *Adam Frank, Thomas A. Gardiner, Guy Delemarter, Thibaut Lery, & Riccardo Betti.* 524, 947 (1999)

FRANX, MARIJN. The Velocity Dispersion of MS 1054−03: A Massive Galaxy Cluster at High Redshift. *Kim-Vy H. Tran, Daniel D. Kelson, Peter van Dokkum, Marijn Franx, Garth D. Illingworth, & Daniel Magee.* 522, 39 (1999)

FREDERIKS, D. D. Where Is SGR 1806−20? *K. Hurley, C. Kouveliotou, T. Cline, E. Mazets, S. Golenetskii, D. D. Frederiks, & J. van Paradijs.* 523, L37 (1999)

FREEDMAN, WENDY L. A Cepheid Distance to NGC 4603 in Centaurus. *Jeffrey A. Newman, Stephen E. Zepf, Marc Davis, Wendy L. Freedman, Barry F. Madore, Peter B. Stetson, N. Silbermann, & Randy Phelps.* 523, 506 (1999)

See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

FREEMAN, K. C. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

FREEMAN, P. E. Statistical Analysis of Spectral Line Candidates in Gamma-Ray Burst GRB 870303. *P. E. Freeman, C. Graziani, D. Q. Lamb, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 753 (1999)

Resonant Cyclotron Radiation Transfer Model Fits to Spectra from Gamma-Ray Burst GRB 870303. *P. E. Freeman, D. Q. Lamb, J. C. L. Wang, I. Wasserman, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 772 (1999)

FREESE, KATHERINE. Constraining the Cosmic Abundance of Stellar Remnants with Multi-TeV Gamma Rays. *David S. Graff, Katherine Freese, Terry P. Walker, & Marc H. Pinsonneault.* 523, L77 (1999)

FREUDLING, WOLFRAM. Large-Scale Power Spectrum and Cosmological Parameters from SFI Peculiar Velocities. *Wolfram Freudling, Idit Zehavi, Luiz N. da Costa, Avishai Dekel, Amiram Eldar, Riccardo Giovanelli, Martha P. Haynes, John J. Salzer, Gary Wegner, & Saleem Zaroubi.* 523, 1 (1999)

FRIED, J. See THOMPSON, D., et al. The Surface Density of Extremely Red Objects.

FRONING, C. S. The Quiescent Accretion Disk in IP Pegasi at Near-Infrared Wavelengths. *C. S. Froning, E. L. Robinson, William F. Welsh, & Janet H. Wood.* 523, 399 (1999)

FRONTERA, F. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

See WIJERS, R. A. M. J., et al. Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope.

FRY, J. N. Projection and Galaxy Clustering Fourier Spectra. *J. N. Fry & David Thomas.* 524, 591 (1999)

FRYER, CHRIS L. Mass Limits for Black Hole Formation. *Chris L. Fryer.* 522, 413 (1999)

FUENMAYOR, F. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

FUJIWARA, HIDEO. See MAEZAWA, HIROYUKI, et al. Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud.

FUKUGITA, M. A Galaxy X-Ray Fundamental Plane? *M. Fukugita & P. J. E. Peebles.* 524, L31 (1999)

FUKUGITA, MASATAKA. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

FURMAN, I. Molecular Hydrogen on Astrophysically Relevant Surfaces. *N. Katz, I. Furman, O. Biham, V. Pirronello, & G. Vidali.* 522, 305 (1999)

FUSI-PECCI, F. See ROOD, R. T., et al. The Luminosity Function of M3.

GABRIEL, A. H. Transition-Region Network Boundaries in the Quiet Sun: Width Variation with Temperature as Observed with CDS on *SOHO*. *S. Patsourakos, J.-C. Vial, A. H. Gabriel, & N. Bellamine.* 522, 540 (1999)

GAENSLER, B. M. Transient Radio Emission from SAX J1808.4−3658. *B. M. Gaensler, B. W. Stappers, & T. J. Getts.* 522, L117 (1999)

GAITE, JOSÉ. The Fractal Distribution of Galaxies and the Transition to Homogeneity. *José Gaite, Alvaro Domínguez, & Juan Pérez-Mercader.* 522, L5 (1999)

GALAMA, T. J. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

Physical Parameters of GRB 970508 and GRB 971214 from Their Afterglow Synchrotron Emission. *R. A. M. J. Wijers & T. J. Galama.* 523, 177 (1999)

See WIJERS, R. A. M. J., et al. Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope.

GALINSKI, V. L. Evolution of Nonlinear Alfvén Waves in Streaming Inhomogeneous Plasmas. *B. Buti, V. L. Galinski, V. I. Shevchenko, G. S. Lakhina, B. T. Tsurutani, B. E. Goldstein, P. Diamond, & M. V. Medvedev.* 523, 849 (1999)

GALLAGHER, J. S. Kinematics and Structure of the Starburst Galaxy NGC 7673. *N. L. Homeier & J. S. Gallagher.* 522, 199 (1999)

GALLAGHER, P. T. The Radial and Angular Variation of the Electron Density in the Solar Corona. *P. T. Gallagher, M. Mathioudakis, F. P. Keenan, K. J. H. Phillips, & K. Tsinganos.* 524, L133 (1999)

GALLIMORE, J. F. Neutral Hydrogen (21 Centimeter) Absorption in Seyfert Galaxies: Evidence for Free-Free Absorption and Subkiloparsec Gaseous Disks. *J. F. Gallimore, S. A. Baum, C. P. O'Dea, A. Pedlar, & E. Brinks.* 524, 684 (1999)

Gasdynamics in the Luminous Merger NCG 6240. *L. J. Tacconi, R. Genzel, M. Tecza, J. F. Gallimore, D. Downes, & N. Z. Scoville.* 524, 732 (1999)

GAMMIE, C. F. On the Turbulent Velocity Dispersion in Molecular Clouds. *P. C. Myers & C. F. Gammie.* 522, L141 (1999)

GAMMIE, CHARLES F. Efficiency of Magnetized Thin Accretion Disks in the Kerr Metric. *Charles F. Gammie.* 522, L57 (1999)

GANGA, KEN. An *Infrared Space Observatory* Upper Limit to the Low-Mass Star Halo in the Edge-on Galaxy NGC 4565. *Charles Beichman, George Helou, Dave Van Buren, Ken Ganga, & F. X. Desert.* 523, 559 (1999)

GAO, Y. The Nature of the Diffuse Clumps and the X-Ray Companion of Markarian 273. *X.-Y. Xia, S. Mao, H. Wu, X.-W. Liu, Y. Gao, Z.-G. Deng, & Z.-L. Zou.* 524, 746 (1999)

GARAIMOV, V. I. Second-Harmonic Plasma Radiation of Magnetically Trapped Electrons in Stellar Coronae. *A. V. Stepanov, B. Kliem, A. Krüger, J. Hildebrandt, & V. I. Garaimov.* 524, 961 (1999)

GARDINER, THOMAS A. Ambipolar Diffusion in Young Stellar Object Jets. *Adam Frank, Thomas A. Gardiner, Guy Delemarter, Thibaut Lery, & Riccardo Betti.* 524, 947 (1999)

GARDINI, A. Cluster Mass Function in Mixed Models. *A. Gardini, S. A. Bonometto, & G. Murante.* 524, 510 (1999)

GARNAVICH, P. M. *BVRI* Observations of the Optical Afterglow of GRB 990510. *K. Z. Stanek, P. M. Garnavich, J. Kaluzny, W. Pych, & I. Thompson.* 522, L39 (1999)

GAUDI, B. S. See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

GEBALLE, T. R. Observations of H_3^+ in Dense Molecular Clouds. *B. J. McCall, T. R. Geballe, K. H. Hinkle, & T. Oka.* 522, 338 (1999)

See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

H_2 Quadrupole and H_3^+ Emission from Uranus: The Uranian Thermosphere, Ionosphere, and Aurora. *L. M. Trafton, S. Miller, T. R. Geballe, J. Tennyson, & G. E. Ballester.* 524, 1059 (1999)

GEBBIE, TIM. The Limits on Cosmological Anisotropies and Inhomogeneities from *COBE* Data: Erratum. *William R. Stoeger, S.J., Marcelo E. Araujo, & Tim Gebbie.* 522, 559 (1999) (Orig. paper in 476, 435 (1997))

GEBHARD, M. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

GEHRELS, N. Transient Gamma-Ray Observations of Gamma-Ray Lines from Novae. I. Limits on the Positron Annihilation Line in Five Individual Novae. *M. J. Harris, J. E. Naya, B. J. Teegarden, T. L. Cline, N. Gehrels, D. M. Palmer, R. Ramaty, & H. Seifert.* 522, 424 (1999)

GENZEL, R. Gasdynamics in the Luminous Merger NCG 6240. *L. J. Tacconi, R. Genzel, M. Tecza, J. F. Gallimore, D. Downes, & N. Z. Scoville.* 524, 732 (1999)

GENZEL, REINHARD. Variable and Embedded Stars in the Galactic Center. *Thomas Ott, Andreas Eckart, & Reinhard Genzel.* 523, 248 (1999)

GEORGE, I. M. The Properties of the Relativistic Iron K-Line in NGC 3516. *K. Nandra, I. M. George, R. F. Mushotzky, T. J. Turner, & T. Yaqoob.* 523, L17 (1999)

On X-Ray Variability in Seyfert Galaxies. *T. J. Turner, I. M. George, K. Nandra, & D. Turcan.* 524, 667 (1999)

GERAKINES, P. A. Observations of Solid Carbon Dioxide in Molecular Clouds with the *Infrared Space Observatory*. *P. A. Gerakines, D. C. B. Whittet, P. Ehrenfreund, A. C. A. Boogert, A. G. G. M. Tielens, W. A. Schutte, J. E. Chiar, E. F. van Dishoeck, T. Prusti, F. P. Helmich, & Th. de Graauw.* 522, 357 (1999)

GETTS, T. J. Transient Radio Emission from SAX J1808.4−3658. *B. M. Gaensler, B. W. Stappers, & T. J. Getts.* 522, L117 (1999)

GHIGNA, SEBASTIANO. Dark Matter Substructure within Galactic Halos. *Ben Moore, Sebastiano Ghigna, Fabio Governato, George Lake, Thomas Quinn, Joachim Stadel, & Paolo Tozzi.* 524, L19 (1999)

GHOSH, S. K. Far-Infrared Observations of the Galactic Star-forming Regions Associated with IRAS 00339+6312 and RAFGL 5111. *B. Mookerjea, S. K. Ghosh, A. D. Karnik, T. N. Rengarajan, S. N. Tandon, & R. P. Verma.* 522, 285 (1999)

GIANNAKOPOULOU-CREIGHTON, JEAN. Star Formation in the Giant H II Regions of M101. *Jean Giannakopoulou-Creighton, Michel Fich, & Christine D. Wilson.* 522, 238 (1999)

GIARRUSSO, S. See SANTANGELO, A., et al. A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features.

GIBLIN, T. See WIJERS, R. A. M. J., et al. Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope.

GIBLIN, T. W. Evidence for an Early High-Energy Afterglow Observed with BATSE from GRB 980923. *T. W. Giblin, J. van Paradijs, C. Kouveliotou, V. Connaughton, R. A. M. J. Wijers, M. S. Briggs, R. D. Preece, & G. J. Fishman.* 524, L47 (1999)

GIBSON, B. K. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

GIBSON, BRAD K. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

GILLILAND, RONALD L. Faint, Moving Objects in the Hubble Deep Field: Components of the Dark Halo? *Rodrigo A. Ibata, Harvey B. Richer, Ronald L. Gilliland, & Douglas Scott.* 524, L95 (1999)

GILMAN, P. A. Joint Instability of Latitudinal Differential Rotation and Toroidal Magnetic Fields below the Solar Convection Zone. III. Unstable Disturbance Phenomenology and the Solar Cycle. *P. A. Gilman & P. A. Fox.* 522, 1167 (1999)

GIOVANELLI, RICCARDO. See FREUDLING, WOLFRAM, et al. Large-Scale Power Spectrum and Cosmological Parameters from SFI Peculiar Velocities.

GIOVANNINI, G. B2 1144+35: A Giant Low-Power Radio Galaxy with Superluminal Motion. *G. Giovannini, G. B. Taylor, E. Arbizzani, M. Bondi, W. D. Cotton, L. Feretti, L. Lara, & T. Venturi.* 522, 101 (1999)

GIRARD, TERRENCE M. A Large Local Rotational Speed for the Galaxy Found from Proper Motions: Implications for the Mass of the Milky Way. *René A. Méndez, Imants Platais, Terrence M. Girard, Vera Kozhurina-Platais, & William F. van Altena.* 524, L39 (1999)

GIRART, JOSÉ M. The HCO^+ Molecular Outflow in NGC 2071. *José M. Girart, Paul T. P. Ho, Alexander L. Rudolph, Robert Estalella, David J. Wilner, & Lawrence M. Chernin.* 522, 921 (1999)

GIRAUD, EDMOND. Dark Mass–to–Luminous Mass Coupling in Virgo. *Edmond Giraud.* 524, L15 (1999)

GIZIS, JOHN E. See BURGASSER, ADAM J., et al. Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey.

GNEDIN, OLEG Y. Effects of Tidal Shocks on the Evolution of Globular Clusters. *Oleg Y. Gnedin, Hyung Mok Lee, & Jeremiah P. Ostriker.* 522, 935 (1999)

GOAD, M. R. NGC 3516: The Long-Term Variability of the Active Galactic Nucleus Emission-Line and Absorption-Line Regions. *M. R. Goad, A. P. Koratkar, J. Kim-Quijano, K. T. Korista, P. T. O'Brien, & D. J. Axon.* 524, 707 (1999)

GODON, PATRICK. Vortices in Protoplanetary Disks. *Patrick Godon & Mario Livio.* 523, 350 (1999)

GOICOECHEA, L. J. Eulerian Perturbative Approximations in Planar Symmetry. *A. P. Raposo, L. J. Goicoechea, & J. Buitrago.* 523, 16 (1999)

GOLDBERG, DAVID M. A Comparison of Simple Mass Estimators for Galaxy Clusters. *Tereasa G. Brainerd, Candace Oaxaca Wright, David M. Goldberg, & Jens Verner Villumsen.* 524, 9 (1999)

GOLDREICH, PETER. Gravity Modes in ZZ Ceti Stars. III. Effects of Turbulent Dissipation. *Peter Goldreich & Yanqin Wu.* 523, 805 (1999)

GOLDSMITH, PAUL F. A New Method for Determining the Dust Temperature Distribution in Star-forming Regions. *Di Li, Paul F. Goldsmith, & Taoling Xie.* 522, 897 (1999)

GOLDSTEIN, B. E. Evolution of Nonlinear Alfvén Waves in Streaming Inhomogeneous Plasmas. *B. Buti, V. L. Galinski, V. I. Shevchenko, G. S. Lakhina, B. T. Tsurutani, B. E. Goldstein, P. Diamond, & M. V. Medvedev.* 523, 849 (1999)

GOLENETSKII, S. Where Is SGR 1806−20? *K. Hurley, C. Kouveliotou, T. Cline, E. Mazets, S. Golenetskii, D. D. Frederiks, & J. van Paradijs.* 523, L37 (1999)

GOLIMOWSKI, DAVID A. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

GÓMEZ, J.-L. High-Resolution Three-dimensional Simulations of Relativistic Jets. *M. A. Aloy, J. M. Ibáñez, J. M. Martí, J.-L. Gómez, & E. Müller.* 523, L125 (1999)

GÓMEZ, JOSÉ-LOUIS. Outburst in the Polarized Structure of the Compact Jet of 3C 454.3. *José-Louis Gómez, Alan P. Marscher, & Antonio Alberdi.* 522, 74 (1999)

GONÇALVES, DENISE R. Jets, Knots, and Tails in Planetary Nebulae: NGC 3918, K1-2, and Wray 17-1. *Romano L. M. Corradi, Mario Perinotto, Eva Villaver, Antonio Mampaso, & Denise R. Gonçalves.* 523, 721 (1999)

GOODMAN, ALYSSA A. The Spectral Correlation Function: A New Tool for Analyzing Spectral Line Maps. *Erik W. Rosolowsky, Alyssa A. Goodman, David J. Wilner, & Jonathan P. Williams.* 524, 887 (1999)

GOODSON, ANTHONY P. Jets from Accreting Magnetic Young Stellar Objects. I. Comparison of Observations and High-Resolution Simulation Results. *Anthony P. Goodson, Karl-Heinz Böhm, & Robert M. Winglee.* 524, 142 (1999)

Jets from Accreting Magnetic Young Stellar Objects. II. Mechanism Physics. *Anthony P. Goodson & Robert M. Winglee.* 524, 159 (1999)

GOSS, W. M. The Sizes of 1720 MHz OH Masers: VLBA and MERLIN Observations of the Supernova Remnants W44 and W28. *M. J. Claussen, W. M. Goss, D. A. Frail, & K. Desai.* 522, 349 (1999)

Infrared Candidates for the Intense Galactic X-Ray Source GX 17+2. *Eric W. Deutsch, Bruce Margon, Scott F. Anderson, Stefanie Wachter, & W. M. Goss.* 524, 406 (1999)

GOTTHELF, E. V. On the Spin History of the X-Ray Pulsar in Kes 73: Further Evidence for an Ultramagnetized Neutron Star. *E. V. Gotthelf, G. Vasisht, & T. Dotani.* 522, L49 (1999)

GOULD, A. See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

GOULD, ANDREW. Correlated Errors in *Hipparcos* Parallaxes toward the Pleiades and the Hyades. *Vijay K. Narayanan & Andrew Gould.* 523, 328 (1999)

Sagittarius A* "Visual Binaries": A Direct Measurement of the Galactocentric Distance. *Samir Salim & Andrew Gould.* 523, 633 (1999)

Photometric Microlens Parallaxes with the *Space Interferometry Mission*. *Andrew Gould & Samir Salim.* 524, 794 (1999)

GOVERNATO, FABIO. Dark Matter Substructure within Galactic Halos. *Ben Moore, Sebastiano Ghigna, Fabio Governato, George Lake, Thomas Quinn, Joachim Stadel, & Paolo Tozzi.* 524, L19 (1999)

GRADY, C. A. *Hubble Space Telescope* Space Telescope Imaging Spectrograph Coronagraphic Imaging of the Herbig AE Star AB Aurigae. *C. A. Grady, B. Woodgate, F. C. Bruhweiler, A. Boggess, Philip Plait, Don J. Lindler, M. Clampin, & P. Kalas.* 523, L151 (1999)

GRAFF, DAVID S. Constraining the Cosmic Abundance of Stellar Remnants with Multi-TeV Gamma Rays. *David S. Graff, Katherine Freese, Terry P. Walker, & Marc H. Pinsonneault.* 523, L77 (1999)

GRAHAM, ALISTER W. The Influence of Bulge Profile Shapes on Claims for a Scale-free Hubble Sequence for Spiral Galaxies. *Alister W. Graham & Mercedes Prieto.* 524, L23 (1999)

GRAHAM, JOHN A. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

GRATTON, RAFFAELE G. An Abundance Analysis for Five Red Horizontal-Branch Stars in the Extremely Metal-rich Globular Cluster NGC 6553. *Judith G. Cohen, Raffaele G. Gratton, Bradford B. Behr, & Eugenio Carretta.* 523, 739 (1999)

GRAZIANI, C. Statistical Analysis of Spectral Line Candidates in Gamma-Ray Burst GRB 870303. *P. E. Freeman, C. Graziani, D. Q. Lamb, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 753 (1999)

GREBEL, EVA K. A New Culprit in the Second-Parameter Problem in the Sculptor Dwarf Spheroidal Galaxy? *Denise Hurley-Keller, Mario Mateo, & Eva K. Grebel.* 523, L25 (1999)

GREENHILL, J. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

GREGG, MICHAEL D. What Determines the Depth of Broad Absorption Lines? Keck HIRES Observations of BALQSO 1603+3002. *Nahum Arav, Robert H. Becker, Sally A. Laurent-Muehleisen, Michael D. Gregg, Richard L. White, Michael S. Brotherton, & Martijn de Kool.* 524, 566 (1999)

GREINER, J. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

See HURLEY, K., et al. A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes.

GRIEST, KIM. Astrometric Microlensing as a Method of Discovering and Characterizing Extrasolar Planets. *Neda Safizadeh, Neal Dalal, & Kim Griest.* 522, 512 (1999)

GROOT, P. J. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

GROSDIDIER, YVES. Dust Formation in the Hot Massive Binary HD 192641 = WR 137 (WC 7+OB). *Sergey V. Marchenko, Anthony F. J. Moffat, & Yves Grosdidier.* 522, 433 (1999)

GRUNDAHL, F. Hot Horizontal-Branch Stars: The Ubiquitous Nature of the "Jump" in Strömgren *u*, Low Gravities, and the Role of Radiative Levitation of Metals. *F. Grundahl, M. Catelan, W. B. Landsman, P. B. Stetson, & M. I. Andersen.* 524, 242 (1999)

GU, WEI-MIN. Global Dynamics of Advection-dominated Accretion Revisited. *Ju-Fu Lu, Wei-Min Gu, & Feng Yuan.* 523, 340 (1999)

GUERRERO, M. A. On the Chemical Abundances of Multiple-Shell Planetary Nebulae with Halos. *M. A. Guerrero & A. Manchado.* 522, 378 (1999)

GUHATHAKURTA, MADHULIKA. Semiempirical Two-dimensional Magnetohydrodynamic Model of the Solar Corona and Interplanetary Medium. *Edward C. Sittler, Jr., & Madhulika Guhathakurta.* 523, 812 (1999)

GULL, T. R. See SAHU, M. S., et al. The D/H Ratio in Interstellar Gas toward G191−B2B.

GUNN, JAMES E. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

GUSTAFSON, BO Å. S. Comparison between Multisphere Light-scattering Calculations: Rigorous Solution and Discrete Dipole Approximation:

Erratum. *Yu-lin Xu & Bo Å. S. Gustafson.* 522, 1206 (1999) (Orig. paper in 513, 894 (1999))

HACHISU, IZUMI. A Wide Symbiotic Channel to Type Ia Supernovae. *Izumi Hachisu, Mariko Kato, & Ken'ichi Nomoto.* 522, 487 (1999)

The Origin of the Diversity of Type Ia Supernovae and the Environmental Effects. *Hideyuki Umeda, Ken'ichi Nomoto, Chiaki Kobayashi, Izumi Hachisu, & Mariko Kato.* 522, L43 (1999)

HAFFNER, L. M. WHAM Observations of Hα, [S II], and [N II] toward the Orion and Perseus Arms: Probing the Physical Conditions of the Warm Ionized Medium. *L. M. Haffner, R. J. Reynolds, & S. L. Tufte.* 523, 223 (1999)

HALL, DOYLE. An Analysis of 17 Years of *Voyager* Observations of the Diffuse Far-Ultraviolet Radiation Field. *Jayant Murthy, Doyle Hall, Matthew Earl, R. C. Henry, & J. B. Holberg.* 522, 904 (1999)

HALPERN, JULES. An *RXTE* Observation of NGC 6300: A New Bright Compton Reflection–dominated Seyfert 2 Galaxy. *Karen M. Leighly, Jules Halpern, Hisamitsu Awaki, Massimo Cappi, Shiro Ueno, & Joachim Siebert.* 522, 209 (1999)

Discovery of a Hard X-Ray Source, SAX J0635+0533, in the Error Box of the Gamma-Ray Source 2EG 0635+0521. *Philip Kaaret, Santina Piraino, Jules Halpern, & Michael Eracleous.* 523, 197 (1999)

HAMILTON, DONALD. Galaxy Clustering and Large-Scale Structure from $z = 0.2$ to $z = 0.5$ in Two Norris Redshift Surveys. *Todd A. Small, Chung-Pei Ma, Wallace L. W. Sargent, & Donald Hamilton.* 524, 31 (1999)

HAN, MINGSHENG. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

HANKINS, TIMOTHY H. Polarimetric Properties of the Crab Pulsar between 1.4 and 8.4 GHz. *David A. Moffett & Timothy H. Hankins.* 522, 1046 (1999)

HANSEN, J. E. Measurement of the Absolute Photoionization Cross Section of C^+ near Threshold. *H. Kjeldsen, F. Folkmann, J. E. Hansen, H. Knudsen, M. S. Rasmussen, J. B. West, & T. Andersen.* 524, L143 (1999)

HARDEE, PHILIP E. On the Dynamics and Structure of Three-dimensional Trans-Alfvénic Jets. *Philip E. Hardee & Alexander Rosen.* 524, 650 (1999)

HARDING, A. K. A *Rossi X-Ray Timing Explorer* Observation of the Vela Pulsar: Filling in the X-Ray Gap. *M. S. Strickman, A. K. Harding, & O. C. de Jager.* 524, 373 (1999)

HARDING, PAUL. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

HARRIS, F. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

HARRIS, FREDERICK H. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

HARRIS, HUGH C. A Very Low Luminosity, Very Cool, DC White Dwarf. *Hugh C. Harris, Conard C. Dahn, Frederick J. Vrba, Arne A. Henden, James Liebert, Gary D. Schmidt, & I. Neill Reid.* 524, 1000 (1999)

HARRIS, M. J. Transient Gamma-Ray Observations of Gamma-Ray Lines from Novae. I. Limits on the Positron Annihilation Line in Five Individual Novae. *M. J. Harris, J. E. Naya, B. J. Teegarden, T. L. Cline, N. Gehrels, D. M. Palmer, R. Ramaty, & H. Seifert.* 522, 424 (1999)

HARRISON, F. A. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet. *F. A. Harrison, J. S. Bloom, D. A. Frail, R. Sari, S. R. Kulkarni, S. G. Djorgovski, T. Axelrod, J. Mould, B. P. Schmidt, M. H. Wieringa, R. M. Wark, R. Subrahmanyan, D. McConnell, P. J. McCarthy, B. E. Schaefer, R. G. McMahon, R. O. Markze, E. Firth, P. Soffita, & L. Amati.* 523, L121 (1999)

HARTMANN, D. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

HARVEY, JOHN. Bright Chromospheric Grains and the Magnetic Intranetwork. *John Worden, John Harvey, & Richard Shine.* 523, 450 (1999)

HARWIT, MARTIN. TeV Cerenkov Events as Bose-Einstein Gamma Condensations. *Martin Harwit, R. J. Protheroe, & P. L. Biermann.* 524, L91 (1999)

HASHIMOTO, MASA-AKI. Nucleosynthesis on ONeMg Novae: Models versus Observations to Constrain the Masses of ONeMg White Dwarfs and Their Envelopes. *Shinya Wanajo, Masa-aki Hashimoto, & Ken'ichi Nomoto.* 523, 409 (1999)

HASHIMOTO, YASUHIRO. Star Formation in Las Campanas Compact Groups. *Sahar S. Allam, Douglas L. Tucker, Huan Lin, & Yasuhiro Hashimoto.* 522, L89 (1999)

HAUSER, MICHAEL G. Cosmic Histories of Stars, Gas, Heavy Elements, and Dust in Galaxies. *Yichuan C. Pei, S. Michael Fall, & Michael G. Hauser.* 522, 604 (1999)

HAYASHIDA, N. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

HAYNES, M. P. Eccentric Behavior of Disk Galaxies. *R. V. E. Lovelace, L. Zhang, D. A. Kornreich, & M. P. Haynes.* 524, 634 (1999)

HAYNES, MARTHA P. See FREUDLING, WOLFRAM, et al. Large-Scale Power Spectrum and Cosmological Parameters from SFI Peculiar Velocities.

HAZARD, CYRIL. *Hubble Space Telescope* Faint Object Spectrograph Observations of a Unique Grouping of Five QSOs: The Sizes and Shapes of Low-z Lyα Forest Absorbers. *Eric M. Monier, David A. Turnshek, & Cyril Hazard.* 522, 627 (1999)

HAZEN, M. L. Evolution of the Light Echo of SN 1991T. *W. B. Sparks, F. Macchetto, N. Panagia, F. R. Boffi, D. Branch, M. L. Hazen, & M. Della Valle.* 523, 585 (1999)

HECKMAN, TIMOTHY M. The Taxonomy of Blue Amorphous Galaxies. II. Structure and Evolution. *Amanda T. Marlowe, Gerhardt R. Meurer, & Timothy M. Heckman.* 522, 183 (1999)

Very Extended X-Ray and Hα Emission in M82: Implications for the Superwind Phenomenon. *Matthew D. Lehnert, Timothy M. Heckman, & Kimberly A. Weaver.* 523, 575 (1999)

HEERIKHUISEN, J. Magnetic Reconnection Solutions in the Presence of Multiple Nulls. *I. J. D. Craig, R. B. Fabling, J. Heerikhuisen, & P. G. Watson.* 523, 838 (1999)

HEISE, J. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

A New Bursting X-Ray Transient: SAX J1750.8−2900. *L. Natalucci, R. Cornelisse, A. Bazzano, M. Cocchi, P. Ubertini, J. Heise, J. J. M. in 't Zand, & E. Kuulkers.* 523, L45 (1999)

HELMICH, F. P. See GERAKINES, P. A., et al. Observations of Solid Carbon Dioxide in Molecular Clouds with the *Infrared Space Observatory*.

HELOU, GEORGE. An *Infrared Space Observatory* Upper Limit to the Low-Mass Star Halo in the Edge-on Galaxy NGC 4565. *Charles Beichman, George Helou, Dave Van Buren, Ken Ganga, & F. X. Desert.* 523, 559 (1999)

HENDEN, ARNE A. A Very Low Luminosity, Very Cool, DC White Dwarf. *Hugh C. Harris, Conard C. Dahn, Frederick J. Vrba, Arne A. Henden, James Liebert, Gary D. Schmidt, & I. Neill Reid.* 524, 1000 (1999)

HENESSEY, G. S. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

HENNING, P. A. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

HENRY, R. C. An Analysis of 17 Years of *Voyager* Observations of the Diffuse Far-Ultraviolet Radiation Field. *Jayant Murthy, Doyle Hall, Matthew Earl, R. C. Henry, & J. B. Holberg.* 522, 904 (1999)

HERBIG, T. See MILLER, A. D., et al. A Measurement of the Angular Power Spectrum of the Cosmic Microwave Background from $l = 100$ to 400.

HERBST, ERIC. The Abundance of C_7^- in Diffuse Clouds. *Deborah P. Ruffle, R. P. A. Bettens, Radoslava Terzieva, & Eric Herbst.* 523, 678 (1999)

HERNANDEZ, J. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

HERNQUIST, LARS. Closing In on Ω_M: The Amplitude of Mass Fluctuations from Galaxy Clusters and the Lyα Forest. *David H. Weinberg, Rupert A. C. Croft, Lars Hernquist, Neal Katz, & Max Pettini.* 522, 563 (1999)

The Clustering of High-Redshift Galaxies in the Cold Dark Matter Scenario. *Neal Katz, Lars Hernquist, & David H. Weinberg.* 523, 463 (1999)

On the Formation of Boxy and Disky Elliptical Galaxies. *Thorsten Naab, Adreas Burkert, & Lars Hernquist.* 523, L133 (1999)

HERRERA, D. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

HIBBARD, J. E. Luminosity Profiles of Merger Remnants. *J. E. Hibbard & Min S. Yun.* 522, L93 (1999)

HILDEBRANDT, J. Second-Harmonic Plasma Radiation of Magnetically Trapped Electrons in Stellar Coronae. *A. V. Stepanov, B. Kliem, A. Krüger, J. Hildebrandt, & V. I. Garaimov.* 524, 961 (1999)

HILL, F. Solar Cycle Changes in GONG *p*-Mode Frequencies, 1995–1998. *R. Howe, R. Komm, & F. Hill.* 524, 1084 (1999)

HILL, JOHN M. Projection, Spatial Correlations, and Anisotropies in a Large and Complete Sample of Abell Clusters. *Christopher J. Miller, David J. Batuski, Kurt A. Slinglend, & John M. Hill.* 523, 492 (1999)

HILL, K. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

HINDSLEY, ROBERT S. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

HINK, P. L. See WIEDENBECK, M. E., et al. Constraints on the Time Delay between Nucleosynthesis and Cosmic-Ray Acceleration from Observations of Ni and Co.

HINKLE, K. H. Observations of H_3^+ in Dense Molecular Clouds. *B. J. McCall, T. R. Geballe, K. H. Hinkle, & T. Oka.* 522, 338 (1999)

HINKLE, KENNETH. The MgH $B'\ ^2\Sigma^+$–$X\ ^2\Sigma^+$ Transition: A New Tool for Studying Magnesium Isotope Abundances. *Lloyd Wallace, Kenneth Hinkle, Gang Li, & Peter Bernath.* 524, 454 (1999)

HIPPELEIN, H. See THOMPSON, D., et al. The Surface Density of Extremely Red Objects.

HIRASHITA, HIROYUKI. Dust-to-Gas Ratio and Metallicity in Dwarf Galaxies. *Hiroyuki Hirashita.* 522, 220 (1999)

HO, PAUL T. P. The HCO^+ Molecular Outflow in NGC 2071. *José M. Girart, Paul T. P. Ho, Alexander L. Rudolph, Robert Estalella, David J. Wilner, & Lawrence M. Chernin.* 522, 921 (1999)

HOBBS, L. M. Lithium Isotope Ratios in Halo Stars. III. *L. M. Hobbs, J. A. Thorburn, & L. M. Rebull.* 523, 797 (1999)

HÖFLICH, P. A. Jet-induced Explosions of Core Collapse Supernovae. *A. M. Khokhlov, P. A. Höflich, E. S. Oran, J. C. Wheeler, L. Wang, & A. Yu. Chtchelkanova.* 524, L107 (1999)

HOESSEL, JOHN G. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

HOLBERG, J. B. An Analysis of 17 Years of *Voyager* Observations of the Diffuse Far-Ultraviolet Radiation Field. *Jayant Murthy, Doyle Hall, Matthew Earl, R. C. Henry, & J. B. Holberg.* 522, 904 (1999)

See SAHU, M. S., et al. The D/H Ratio in Interstallar Gas toward G191−B2B.

HOLLIMAN, JOHN H., II. Multipressure Polytropes as Models for the Structure and Stability of Molecular Clouds. I. Theory. *Christopher F. McKee & John H. Holliman II.* 522, 313 (1999)

HOLLIS, J. M. The [N II] Kinematics of R Aquarii. *J. M. Hollis, S. N. Vogel, D. Van Buren, J. P. Strong, R. G. Lyon, & J. E. Dorband.* 522, 297 (1999)

HOMEIER, N. L. Kinematics and Structure of the Starburst Galaxy NGC 7673. *N. L. Homeier & J. S. Gallagher.* 522, 199 (1999)

HONDA, H. Temperature Variation in the Cluster of Galaxies Abell 115 Studied with *ASCA*. *R. Shibata, H. Honda, M. Ishida, T. Ohashi, & K. Yamashita.* 524, 603 (1999)

HONDA, K. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

HONEYCUTT, K. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

HONMA, M. Central Rotation Curves of Spiral Galaxies. *Y. Sofue, Y. Tutui, M. Honma, A. Tomita, T. Takamiya, J. Koda, & Y. Takeda.* 523, 136 (1999)

HOOPES, CHARLES G. Diffuse Ionized Gas in Edge-on Spiral Galaxies: Extraplanar and Outer Disk Hα Emission. *Charles G. Hoopes, René A. M. Walterbos, & Richard J. Rand.* 522, 669 (1999)

HOOVER, RICHARD B. Observation and Modeling of the Solar Transition Region. I. Multi-Spectral Solar Telescope Array Observations. *Hakeem M. Oluseyi, A. B. C. Walker II, Jason Porter, Richard B. Hoover, & Troy W. Barbee, Jr.* 524, 1105 (1999)

HOUGH, J. H. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

HOWARD, R. A. Kinematic Measurements of Polar Jets Observed by the Large-Angle Spectrometric Coronagraph. *B. E. Wood, M. Karovska, J. W. Cook, R. A. Howard, & G. E. Brueckner.* 523, 444 (1999)

HOWE, R. Solar Cycle Changes in GONG *p*-Mode Frequencies, 1995–1998. *R. Howe, R. Komm, & F. Hill.* 524, 1084 (1999)

HOWK, J. CHRISTOPHER. Ionized Gas in Damped Lyα Systems and Its Effects on Elemental Abundance Studies. *J. Christopher Howk & Kenneth R. Sembach.* 523, L141 (1999)

HRIVNAK, BRUCE J. An Abundance Analysis of Two Carbon-rich Proto–Planetary Nebulae: IRAS Z02229+6208 and IRAS 07430+1115. *Bacham E. Reddy, Eric J. Bakker, & Bruce J. Hrivnak.* 524, 831 (1999)

The Discovery of Two New Bipolar Proto–Planetary Nebulae: IRAS 16594−4656 and IRAS 17245−3951. *Bruce J. Hrivnak, Sun Kwok, & Kate Y. L. Su.* 524, 849 (1999)

HU, ESTHER M. An Extremely Luminous Galaxy at $z = 5.74$. *Esther M. Hu, Richard G. McMahon, & Lennox L. Cowie.* 522, L9 (1999)

HU, WAYNE. Power Spectrum Tomography with Weak Lensing. *Wayne Hu.* 522, L21 (1999)

HUANG, J.-S. See THOMPSON, D., et al. The Surface Density of Extremely Red Objects.

HUBENY, I. See SAHU, M. S., et al. The D/H Ratio in Interstallar Gas toward G191−B2B.

HUCHRA, JOHN P. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

HÜTTEMEISTER, S. A New High-Resolution CO Map of the Inner 2.5 Arcminutes of M51. I. Streaming Motions and Spiral Structure. *S. Aalto, S. Hüttemeister, N. Z. Scoville, & P. Thaddeus.* 522, 165 (1999)

HUGGINS, P. J. The Molecular Envelope of the Helix Nebula. *K. Young, P. Cox, P. J. Huggins, T. Forveille, & R. Bachiller.* 522, 387 (1999)

HUGHES, A. Constraints on Natal Pulsar Kicks from Eccentric Binary Pulsars. *A. Hughes & M. Bailes.* 522, 504 (1999)

HUGHES, SHAUN M. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

HURLEY, K. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

Where Is SGR 1806−20? *K. Hurley, C. Kouveliotou, T. Cline, E. Mazets, S. Golenetskii, D. D. Frederiks, & J. van Paradijs.* 523, L37 (1999)

A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes. *K. Hurley, P. Li, M. Boer, T. Cline, G. J. Fishman, C. Meegan, C. Kouveliotou, J. Greiner, J. Laros, C. Luginbuhl, F. Vrba, T. Murakami, H. Pedersen, & J. van Paradijs.* 524, 92 (1999)

See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

HURLEY, KEVIN. See WOODS, PETER M., et al. Variable Spin-down in the Soft Gamma Repeater SGR 1900+14 and Correlations with Burst Activity.

HURLEY-KELLER, DENISE. A New Culprit in the Second-Parameter Problem in the Sculptor Dwarf Spheroidal Galaxy? *Denise Hurley-Keller, Mario Mateo, & Eva K. Grebel.* 523, L25 (1999)

HURWITZ, MARK. GHRS and *ORFEUS II* Observations of the Highly Ionized Interstellar Medium toward ESO 141−055. *Kenneth R. Sembach, Blair D. Savage, & Mark Hurwitz.* 524, 98 (1999)

HUSS, GARY R. Circumstellar Hibonite and Corundum and Nucleosynthesis in Asymptotic Giant Branch Stars. *Byeon-Gak Choi, G. J. Wasserburg, & Gary R. Huss.* 522, L133 (1999)

IBÁÑEZ, J. M. High-Resolution Three-dimensional Simulations of Relativistic Jets. *M. A. Aloy, J. M. Ibáñez, J. M. Martí, J.-L. Gómez, & E. Müller.* 523, L125 (1999)

IBATA, RODRIGO A. Faint, Moving Objects in the Hubble Deep Field: Components of the Dark Halo? *Rodrigo A. Ibata, Harvey B. Richer, Ronald L. Gilliland, & Douglas Scott.* 524, L95 (1999)

IKEDA, MASAFUMI. See MAEZAWA, HIROYUKI, et al. Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud.

ILIADIS, CHRISTIAN. Explosive Hydrogen Burning of ^{27}Si, ^{31}S, ^{35}Ar, and ^{39}Ca in Novae and X-Ray Bursts. *Christian Iliadis, Pieter M. Endt, Nikos Prantzos, & William J. Thompson.* 524, 434 (1999)

ILLINGWORTH, GARTH D. The Velocity Dispersion of MS 1054−03: A Massive Galaxy Cluster at High Redshift. *Kim-Vy H. Tran, Daniel D. Kelson, Peter van Dokkum, Marijn Franx, Garth D. Illingworth, & Daniel Magee.* 522, 39 (1999)

See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

IMMLER, STEFAN. An Ultradeep High-Resolution X-Ray Image of M101: The X-Ray Source Population in a Late-Type Spiral. *Q. Daniel Wang, Stefan Immler, & Wolfgang Pietsch.* 523, 121 (1999)

IMPEY, C. D. See FALCO, E. E., et al. Dust and Extinction Curves in Galaxies with $z > 0$: The Interstellar Medium of Gravitational Lens Galaxies.

A Study of Lyα Quasar Absorbers in the Nearby Universe. *C. D. Impey, C. E. Petry, & K. P. Flint.* 524, 536 (1999)

See PENG, C. Y., et al. The Quasar Pair Q1634+267A,B and the Binary QSO versus Dark Lens Hypotheses.

INATANI, JUNJI. See MAEZAWA, HIROYUKI, et al. Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud.

INOUE, N. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

IN 'T ZAND, J. J. M. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

A New Bursting X-Ray Transient: SAX J1750.8−2900. *L. Natalucci, R. Cornelisse, A. Bazzano, M. Cocchi, P. Ubertini, J. Heise, J. J. M. in 't Zand, & E. Kuulkers.* 523, L45 (1999)

INUTSUKA, SHU-ICHIRO. Criteria for Fragmentation of Rotating Isothermal Clouds Revisited. *Toru Tsuribe & Shu-Ichiro Inutsuka.* 523, L155 (1999)

IOANNOU, PETROS J. Optimal Excitation of Magnetic Fields. *Brian F. Farrell & Petros J. Ioannou.* 522, 1079 (1999)

Stochastic Dynamics of Field Generation in Conducting Fluids. *Brian F. Farrell & Petros J. Ioannou.* 522, 1088 (1999)

IRWIN, JIMMY A. *ROSAT* HRI X-Ray Observations of the Open Globular Cluster NGC 288. *Craig L. Sarazin, Jimmy A. Irwin, Robert T. Rood, Francesco R. Ferraro, & Barbara Paltrinieri.* 524, 220 (1999)

ISHIBASHI, K. Recurrent X-Ray Emission Variations of η Carinae and the Binary Hypothesis. *K. Ishibashi, M. F. Corcoran, K. Davidson, J. H. Swank, R. Petre, S. A. Drake, A. Damineli, & S. White.* 524, 983 (1999)

ISHIDA, M. Detection of Hard X-Rays from a Class I Protostar in the HH 24-26 Region in the Orion Molecular Cloud. *H. Ozawa, F. Nagase, Y. Ueda, T. Dotani, & M. Ishida.* 523, L81 (1999)

Temperature Variation in the Cluster of Galaxies Abell 115 Studied with *ASCA*. *R. Shibata, H. Honda, M. Ishida, T. Ohashi, & K. Yamashita.* 524, 603 (1999)

ISHISAKI, YOSHITAKA. The *ASCA* Medium-Sensitivity Survey (The GIS Catalog Project): Source Counts and Evidence for Emerging Population of Hard Sources. *Yoshihiro Ueda, Tadayuki Takahashi, Yoshitaka Ishisaki, Takaya Ohashi, & Kazuo Makishima.* 524, L11 (1999)

ISRAEL, G. L. See SANTANGELO, A., et al. A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features.

ISRAELIAN, G. The Yellow Hypergiants HR 8752 and ρ Cassiopeiae near the Evolutionary Border of Instability. *G. Israelian, A. Lobel, & M. R. Schmidt.* 523, L145 (1999)

ITO, TETSUYA. See MAEZAWA, HIROYUKI, et al. Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud.

ITOH, MASAYUKI. Simultaneous Radio and X-Ray Observations of the Wolf-Rayet Star WR 147. *Stephen L. Skinner, Masayuki Itoh, Fumiaki Nagase, & Svetozar A. Zhekov.* 524, 394 (1999)

IVAN, HUBENY. The Eclipsing Cataclysmic Variable V347 Puppis Revisited. *Marcos P. Diaz & Hubeny Ivan.* 523, 786 (1999)

IVEZIĆ, ŽELJKO. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

JERJEN, H. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

JHA, SAURABH. An Upper Limit on the Reflected Light from the Planet Orbiting the Star τ Bootis. *David Charbonneau, Robert W. Noyes, Sylvain G. Korzennik, Peter Nisenson, Saurabh Jha, Steven S. Vogt, & Robert I. Kibrick.* 522, L145 (1999)

JOG, CHANDA J. Dyanamics in a Lopsided Spiral Galaxy: Negative Disk Response to Perturbation Halo Potential. *Chanda J. Jog.* 522, 661 (1999)

JOHNSON, B. R. See RHIE, S. H., et al. Observations of the Binary Microlens Event MACHO 98-SMC-1 by the Microlensing Planet Search Collaboration.

JOKIPII, J. R. A Two-dimensional, Self-consistent Model of Galactic Cosmic Rays in the Heliosphere. *V. Florinski & J. R. Jokipii.* 523, L185 (1999)

JONSSON, P. See KOLATT, T. S., et al. Young Galaxies: What Turns Them On?

JUDGE, P. G. Spectral Lines for Polarization Measurements of the Coronal Magnetic Field. II. Consistent Treatment of the Stokes Vector for Magnetic-Dipole Transitions. *R. Casini & P. G. Judge.* 522, 524 (1999)

On the Doppler Shifts of Solar Ultraviolet Emission Lines. *H. Peter & P. G. Judge.* 522, 1148 (1999)

KAARET, PHILIP. Discovery of a Hard X-Ray Source, SAX J0635+0533, in the Error Box of the Gamma-Ray Source 2EG 0635+0521. *Philip Kaaret, Santina Piraino, Jules Halpern, & Michael Eracleous.* 523, 197 (1999)

KADOTA, K. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

KAJINO, TOSHITAKA. Evolution of Beryllium and Boron in the Inhomogeneous Early Galaxy. *Takeru Ken Suzuki, Yuzuru Yoshii, & Toshitaka Kajino.* 522, L125 (1999)

KAKIMOTO, F. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

KALAS, P. *Hubble Space Telescope* Space Telescope Imaging Spectrograph Coronagraphic Imaging of the Herbig AE Star AB Aurigae. *C. A. Grady, B. Woodgate, F. C. Bruhweiler, A. Boggess, Philip Plait, Don J. Lindler, M. Clampin, & P. Kalas.* 523, L151 (1999)

KALUZNY, J. *BVRI* Observations of the Optical Afterglow of GRB 990510. *K. Z. Stanek, P. M. Garnavich, J. Kaluzny, W. Pych, & I. Thompson.* 522, L39 (1999)

KAMATA, K. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

KANE, S. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

KANKELBORG, C. C. Coronal Heating by Collision and Cancellation of Magnetic Elements. *D. W. Longcope & C. C. Kankelborg.* 524, 483 (1999)

KARNIK, A. D. Far-Infrared Observations of the Galactic Star-forming Regions Associated with IRAS 00339+6312 and RAFGL 5111. *B. Mookerjea, S. K. Ghosh, A. D. Karnik, T. N. Rengarajan, S. N. Tandon, & R. P. Verma.* 522, 285 (1999)

KAROVSKA, M. Kinematic Measurements of Polar Jets Observed by the Large-Angle Spectrometric Coronagraph. *B. E. Wood, M. Karovska, J. W. Cook, R. A. Howard, & G. E. Brueckner.* 523, 444 (1999)

KASHYAP, VINAY. On X-Ray Variability in Active Binary Stars. *Vinay Kashyap & Jeremy J. Drake.* 524, 988 (1999)

KASPI, SHAI. Modeling Variable Emission Lines in Active Galactic Nuclei: Method and Application to NGC 5548. *Shai Kaspi & Hagai Netzer.* 524, 71 (1999)

KATO, MARIKO. A Wide Symbiotic Channel to Type Ia Supernovae. *Izumi Hachisu, Mariko Kato, & Ken'ichi Nomoto.* 522, 487 (1999)

The Origin of the Diversity of Type Ia Supernovae and the Environmental Effects. *Hideyuki Umeda, Ken'ichi Nomoto, Chiaki Kobayashi, Izumi Hachisu, & Mariko Kato.* 522, L43 (1999)

KATZ, N. Molecular Hydrogen on Astrophysically Relevant Surfaces. *N. Katz, I. Furman, O. Biham, V. Pirronello, & G. Vidali.* 522, 305 (1999)

KATZ, NEAL. Closing In on Ω_M: The Amplitude of Mass Fluctuations from Galaxy Clusters and the Lyα Forest. *David H. Weinberg, Rupert A. C. Croft, Lars Hernquist, Neal Katz, & Max Pettini.* 522, 563 (1999)

The Clustering of High-Redshift Galaxies in the Cold Dark Matter Scenario. *Neal Katz, Lars Hernquist, & David H. Weinberg.* 523, 463 (1999)

KAWAGUCHI, S. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

KAWAI, NOBUYUKI. Spin-down of the 65 Millisecond X-Ray Pulsar in the Supernova Remnant G11.2−0.3. *Ken'ichi Torii, Hiroshi Tsunemi, Tadayasu Dotani, Kazuhisa Mitsuda, Nobuyuki Kawai, Kenzo Kinugasa, Yoshitaka Saito, & Shinpei Shibata.* 523, L69 (1999)

KAWASAKI, Y. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

KAWASUMI, N. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

KAY, LAURA E. The X-Ray Spectra and Spectral Variability of Intermediate-Type Seyfert Galaxies: *ASCA* Observations of NGC 4388 and ESO 103−G35. *Karl Forster, Karen M. Leighly, & Laura E. Kay.* 523, 521 (1999)

KAZANAS, DEMOSTHENES. Formation of Relativistic Outflows in Shearing Black Hole Accretion Coronae. *Prasad Subramanian, Peter A. Becker, & Demosthenes Kazanas.* 523, 203 (1999)

KEENAN, F. P. The Radial and Angular Variation of the Electron Density in the Solar Corona. *P. T. Gallagher, M. Mathioudakis, F. P. Keenan, K. J. H. Phillips, & K. Tsinganos.* 524, L133 (1999)

KEETON, C. R. See FALCO, E. E., et al. Dust and Extinction Curves in Galaxies with $z > 0$: The Interstellar Medium of Gravitational Lens Galaxies.

See PENG, C. Y., et al. The Quasar Pair Q1634+267A,B and the Binary QSO versus Dark Lens Hypotheses.

KELSON, DANIEL. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

KELSON, DANIEL D. The Velocity Dispersion of MS 1054−03: A Massive Galaxy Cluster at High Redshift. *Kim-Vy H. Tran, Daniel D. Kelson, Peter van Dokkum, Marijn Franx, Garth D. Illingworth, & Daniel Magee.* 522, 39 (1999)

KENNICUTT, ROBERT C. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

KENT, STEPHEN. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

KENYON, SCOTT J. Forming the Dusty Ring in HR 4796A. *Scott J. Kenyon, Kenneth Wood, Barbara A. Whitney, & Michael J. Wolff.* 524, L119 (1999)

KEPLER, S. O. Direct Measurement of a Secular Pulsation Period Change in the Pulsating Hot Pre–White Dwarf PG 1159−035. *J. E. S. Costa, S. O. Kepler, & D. E. Winget.* 522, 973 (1999)

KERBER, F. A New Ultradense Group of Obscured Emission-Line Galaxies. *R. Weinberger, S. Temporin, & F. Kerber.* 522, L17 (1999)

KHOKHLOV, A. M. Jet-induced Explosions of Core Collapse Supernovae. *A. M. Khokhlov, P. A. Höflich, E. S. Oran, J. C. Wheeler, L. Wang, & A. Yu. Chtchelkanova.* 524, L107 (1999)

KHOKHLOV, ALEXEI M. Evolution of Bias in Different Cosmological Models. *Pedro Colín, Anatoly A. Klypin, Andrey V. Kravtsov, & Alexei M. Khokhlov.* 523, 32 (1999)

KIBRICK, ROBERT I. An Upper Limit on the Reflected Light from the Planet Orbiting the Star τ Bootis. *David Charbonneau, Robert W. Noyes, Sylvain G. Korzennik, Peter Nihenson, Saurabh Jha, Steven S. Vogt, & Robert I. Kibrick.* 522, L145 (1999)

KILBORN, V. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

KIM, D.-C. Optical Spectroscopy of the *IRAS* 1 Jy Sample of Ultraluminous Infrared Galaxies. *Sylvain Veilleux, D.-C. Kim, & D. B. Sanders.* 522, 113 (1999)

New Results from a Near-Infrared Search for Hidden Broad-Line Regions in Ultraluminous Infrared Galaxies. *Sylvain Veilleux, D. B. Sanders, & D.-C. Kim.* 522, 139 (1999)

KIM, KEE-TAE. Infrared Excess and Molecular Gas in the Galactic Worm GW 46.4+5.5. *Kee-Tae Kim, Jeong-Eun Lee, & Bon-Chul Koo.* 523, 306 (1999)

KIM-QUIJANO, J. NGC 3516: The Long-Term Variability of the Active Galactic Nucleus Emission-Line and Absorption-Line Regions. *M. R. Goad, A. P. Koratkar, J. Kim-Quijano, K. T. Korista, P. T. O'Brien, & D. J. Axon.* 524, 707 (1999)

KING, L. J. See RHIE, S. H., et al. Observations of the Binary Microlens Event MACHO 98-SMC-1 by the Microlensing Planet Search Collaboration.

KINUGASA, KENZO. Spin-down of the 65 Millisecond X-Ray Pulsar in the Supernova Remnant G11.2−0.3. *Ken'ichi Torii, Hiroshi Tsunemi, Tadayasu Dotani, Kazuhisa Mitsuda, Nobuyuki Kawai, Kenzo Kinugasa, Yoshitaka Saito, & Shinpei Shibata.* 523, L69 (1999)

KIPPEN, R. M. See BRIGGS, M. S., et al. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*.

See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

KIRKPATRICK, J. DAVY. See BURGASSER, ADAM J., et al. Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey.

KITAI, REIZABURO. Photospheric and Chromospheric Gas Motions around a Dark Filament. *Tetsuya Magara & Reizaburo Kitai.* 524, 469 (1999)

KJELDSEN, H. Measurement of the Absolute Photoionization Cross Section of C^+ near Threshold. *H. Kjeldsen, F. Folkmann, J. E. Hansen, H. Knudsen, M. S. Rasmussen, J. B. West, & T. Andersen.* 524, L143 (1999)

KLARMANN, J. See WIEDENBECK, M. E., et al. Constraints on the Time Delay between Nucleosynthesis and Cosmic-Ray Acceleration from Observations of Ni and Co.

KLIEM, B. Second-Harmonic Plasma Radiation of Magnetically Trapped Electrons in Stellar Coronae. *A. V. Stepanov, B. Kliem, A. Krüger, J. Hildebrandt, & V. I. Garaimov.* 524, 961 (1999)

KLYPIN, A. A. See KOLATT, T. S., et al. Young Galaxies: What Turns Them On?

KLYPIN, ANATOLY. Where Are the Missing Galactic Satellites? *Anatoly Klypin, Andrey V. Kravtsov, Octavio Valenzuela, & Francisco Prada.* 522, 82 (1999)

KLYPIN, ANATOLY A. Evolution of Bias in Different Cosmological Models. *Pedro Colín, Anatoly A. Klypin, Andrey V. Kravtsov, & Alexei M. Khokhlov.* 523, 32 (1999)

KNAPP, G. R. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

KNEZEK, P. M. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

KNUDSEN, H. Measurement of the Absolute Photoionization Cross Section of C^+ near Threshold. *H. Kjeldsen, F. Folkmann, J. E. Hansen, H. Knudsen, M. S. Rasmussen, J. B. West, & T. Andersen.* 524, L143 (1999)

KOBAYASHI, CHIAKI. The Origin of the Diversity of Type Ia Supernovae and the Environmental Effects. *Hideyuki Umeda, Ken'ichi Nomoto, Chiaki Kobayashi, Izumi Hachisu, & Mariko Kato.* 522, L43 (1999)

KOCHANEK, C. S. See FALCO, E. E., et al. Dust and Extinction Curves in Galaxies with $z > 0$: The Interstellar Medium of Gravitational Lens Galaxies.

See PENG, C. Y., et al. The Quasar Pair Q1634+267A,B and the Binary QSO versus Dark Lens Hypotheses.

KODA, J. Central Rotation Curves of Spiral Galaxies. *Y. Sofue, Y. Tutui, M. Honma, A. Tomita, T. Takamiya, J. Koda, & Y. Takeda.* 523, 136 (1999)

KOHMURA, TAKAYOSHI. Discovery of 715 Second Pulsations from the Faint X-Ray Source AX J170006−4157. *Ken'ichi Torii, Mutsumi Sugizaki, Takayoshi Kohmura, Takao Endo, & Fumiaki Nagase.* 523, L65 (1999)

KOIDE, SHINJI. Relativistic Jet Formation from Black Hole Magnetized Accretion Disks: Method, Tests, and Applications of a General Relativistic Magnetohydrodynamic Numerical Code. *Shinji Koide, Kazunari Shibata, & Takahiro Kudoh.* 522, 727 (1999)

KOLATT, T. POTENT Reconstruction from Mark III Velocities. *A. Dekel, A. Eldar, T. Kolatt, A. Yahil, J. A. Willick, S. M. Faber, S. Courteau, & D. Burstein.* 522, 1 (1999)

KOLATT, T. S. Young Galaxies: What Turns Them On? *T. S. Kolatt, J. S. Bullock, R. S. Somerville, Y. Sigad, P. Jonsson, A. V. Kravtsov, A. A. Klypin, J. R. Primack, S. M. Faber, & A. Dekel.* 523, L109 (1999)

KOMM, R. Solar Cycle Changes in GONG *p*-Mode Frequencies, 1995–1998. *R. Howe, R. Komm, & F. Hill.* 524, 1084 (1999)

KOO, BON-CHUL. Infrared Excess and Molecular Gas in the Galactic Worm GW 46.4+5.5. *Kee-Tae Kim, Jeong-Eun Lee, & Bon-Chul Koo.* 523, 306 (1999)

KOPEIKIN, S. M. Post-Newtonian Theory for Precision Doppler Measurements of Binary Star Orbits. *S. M. Kopeikin & L. M. Ozernoy.* 523, 771 (1999)

KORATKAR, A. P. NGC 3516: The Long-Term Variability of the Active Galactic Nucleus Emission-Line and Absorption-Line Regions. *M. R. Goad, A. P. Koratkar, J. Kim-Quijano, K. T. Korista, P. T. O'Brien, & D. J. Axon.* 524, 707 (1999)

KORCHAGIN, VLADIMIR. Chemical Abundance Gradients in the Star-forming Ring Galaxies. *Vladimir Korchagin, Eduard Vorobyov, & Y. D. Mayya.* 522, 767 (1999)

KORIBALSKI, B. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

KORISTA, K. T. NGC 3516: The Long-Term Variability of the Active Galactic Nucleus Emission-Line and Absorption-Line Regions. *M. R. Goad, A. P. Koratkar, J. Kim-Quijano, K. T. Korista, P. T. O'Brien, & D. J. Axon.* 524, 707 (1999)

KORMENDY, JOHN. The Double Nucleus and Central Black Hole of M31. *John Kormendy & Ralf Bender.* 522, 772 (1999)

KORNREICH, D. A. Eccentric Behavior of Disk Galaxies. *R. V. E. Lovelace, L. Zhang, D. A. Kornreich, & M. P. Haynes.* 524, 634 (1999)

KORZENNIK, SYLVAIN G. An Upper Limit on the Reflected Light from the Planet Orbiting the Star τ Bootis. *David Charbonneau, Robert W. Noyes, Sylvain G. Korzennik, Peter Nihenson, Saurabh Jha, Steven S. Vogt, & Robert I. Kibrick.* 522, L145 (1999)

KOSHUT, T. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

KOSHUT, THOMAS M. See MITROFANOV, IGOR G., et al. The Emission Time of Gamma-Ray Bursts.

KOUVELIOTOU, C. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

See WIJERS, R. A. M. J., et al. Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope.

Where Is SGR 1806−20? *K. Hurley, C. Kouveliotou, T. Cline, E. Mazets, S. Golenetskii, D. D. Frederiks, & J. van Paradijs.* 523, L37 (1999)

See BRIGGS, M. S., et al. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*.

See HURLEY, K., et al. A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes.

Evidence for an Early High-Energy Afterglow Observed with BATSE from GRB 980923. *T. W. Giblin, J. van Paradijs, C. Kouveliotou, V. Connaughton, R. A. M. J. Wijers, M. S. Briggs, R. D. Preece, & G. J. Fishman.* 524, L47 (1999)

See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

KOUVELIOTOU, CHRYSSA. See WOODS, PETER M., et al. Variable Spin-down in the Soft Gamma Repeater SGR 1900+14 and Correlations with Burst Activity.

KOZHURINA-PLATAIS, VERA. A Large Local Rotational Speed for the Galaxy Found from Proper Motions: Implications for the Mass of the Milky Way. *René A. Méndez, Imants Platais, Terrence M. Girard, Vera Kozhurina-Platais, & William F. van Altena.* 524, L39 (1999)

KRAAN-KORTEWEG, R. C. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

KRAVTSOV, A. V. See KOLATT, T. S., et al. Young Galaxies: What Turns Them On?

KRAVTSOV, ANDREY V. Where Are the Missing Galactic Satellites? *Anatoly Klypin, Andrey V. Kravtsov, Octavio Valenzuela, & Francisco Prada.* 522, 82 (1999)

Evolution of Bias in Different Cosmological Models. *Pedro Colín, Anatoly A. Klypin, Andrey V. Kravtsov, & Alexei M. Khokhlov.* 523, 32 (1999)

KROLIK, JULIAN. Imaging a Quasar Accretion Disk with Microlensing. *Eric Agol & Julian Krolik.* 524, 49 (1999)

KRÜGER, A. Second-Harmonic Plasma Radiation of Magnetically Trapped Electrons in Stellar Coronae. *A. V. Stepanov, B. Kliem, A. Krüger, J. Hildebrandt, & V. I. Garaimov.* 524, 961 (1999)

KUDOH, TAKAHIRO. Relativistic Jet Formation from Black Hole Magnetized Accretion Disks: Method, Tests, and Applications of a General Relativistic Magnetohydrodynamic Numerical Code. *Shinji Koide, Kazunari Shibata, & Takahiro Kudoh.* 522, 727 (1999)

KULKARNI, S. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

KULKARNI, S. R. Discovery of a Radio Flare from GRB 990123. *S. R. Kulkarni, D. A. Frail, R. Sari, G. H. Moriarty-Schieven, D. S. Shepherd, P. Udomprasert, A. C. S. Readhead, J. S. Bloom, M. Feroci, & E. Costa.* 522, L97 (1999)

See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

Parallax of PSR J1744−1134 and the Local Interstellar Medium. *M. Toscano, M. C. Britton, R. N. Manchester, M. Bailes, J. S. Sandhu, S. R. Kulkarni, & S. B. Anderson.* 523, L171 (1999)

KUMAR, PAWAN. Gamma-Ray Burst Energetics. *Pawan Kumar.* 523, L113 (1999)

KUNDU, M. R. Multiple Components in the Millimeter Emission of a Solar Flare. *J.-P. Raulin, S. M. White, M. R. Kundu, A. V. R. Silva, & K. Shibasaki.* 522, 547 (1999)

Radio and X-Ray Imaging Observations of a Continuum Burst. *M. R. Kundu, J. P. Raulin, N. Nitta, & A. Raoult.* 522, 1100 (1999)

KURTZ, S. E. A 1000 AU Rotating Disk around the Massive Young Stellar Object G192.16−3.82. *D. S. Shepherd & S. E. Kurtz.* 523, 690 (1999)

KUSANO, E. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

KUSUNOSE, MASAAKI. A Novel Mechanism for the Formation of Electron-Positron Outflow from Hot Accretion Disks. *Tatsuya Yamasaki, Fumio Takahara, & Masaaki Kusunose.* 523, L21 (1999)

KUULKERS, E. A New Bursting X-Ray Transient: SAX J1750.8−2900. *L. Natalucci, R. Cornelisse, A. Bazzano, M. Cocchi, P. Ubertini, J. Heise, J. J. M. in 't Zand, & E. Kuulkers.* 523, L45 (1999)

KWOK, SUN. The Discovery of Two New Bipolar Proto–Planetary Nebulae: IRAS 16594−4656 and IRAS 17245−3951. *Bruce J. Hrivnak, Sun Kwok, & Kate Y. L. Su.* 524, 849 (1999)

LABHARDT, LUKAS. Cepheid Calibration of the Peak Brightness of Type Ia Supernovae. IX. SN 1989B in NGC 3627. *A. Saha, Allan Sandage, G. A. Tammann, Lukas Labhardt, F. D. Macchetto, & N. Panagia.* 522, 802 (1999)

LAI, DONG. Magnetically Driven Warping, Precession, and Resonances in Accretion Disks. *Dong Lai.* 524, 1030 (1999)

LAKE, GEORGE. Dark Matter Substructure within Galactic Halos. *Ben Moore, Sebastiano Ghigna, Fabio Governato, George Lake, Thomas Quinn, Joachim Stadel, & Paolo Tozzi.* 524, L19 (1999)

LAKHINA, G. S. Evolution of Nonlinear Alfvén Waves in Streaming Inhomogeneous Plasmas. *B. Buti, V. L. Galinski, V. I. Shevchenko, G. S. Lakhina, B. T. Tsurutani, B. E. Goldstein, P. Diamond, & M. V. Medvedev.* 523, 849 (1999)

LAKOSI, L. De-Excitation of ^{180}mTa by ^{60}Co Gamma Rays. *I. Bikit, L. Lakosi, J. Sáfár, & Lj. Čonkić.* 522, 419 (1999)

LAMB, D. Q. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

Statistical Analysis of Spectral Line Candidates in Gamma-Ray Burst GRB 870303. *P. E. Freeman, C. Graziani, D. Q. Lamb, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 753 (1999)

Resonant Cyclotron Radiation Transfer Model Fits to Spectra from Gamma-Ray Burst GRB 870303. *P. E. Freeman, D. Q. Lamb, J. C. L. Wang, I. Wasserman, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 772 (1999)

LAMB, DONALD Q. A Photometric Investigation of the GRB 970228 Afterglow and the Associated Nebulosity. *Francisco J. Castander & Donald Q. Lamb.* 523, 593 (1999)

The Extinction toward the GRB 970228 Field. *Francisco J. Castander & Donald Q. Lamb.* 523, 602 (1999)

LAMBERT, DAVID L. Rubidium in Metal-deficient Disk and Halo Stars. *Jocelyn Tomkin & David L. Lambert.* 523, 234 (1999)

LANDSMAN, W. See SAHU, M. S., et al. The D/H Ratio in Interstellar Gas toward G191−B2B.

LANDSMAN, W. B. Hot Horizontal-Branch Stars: The Ubiquitous Nature of the "Jump" in Strömgren *u*, Low Gravities, and the Role of Radiative Levitation of Metals. *F. Grundahl, M. Catelan, W. B. Landsman, P. B. Stetson, & M. I. Andersen.* 524, 242 (1999)

LANGER, WILLIAM D. On the Stability and Evolution of Isolated Bok Globules. *Richard P. Nelson & William D. Langer.* 524, 923 (1999)

LANZETTA, K. M. The Gaseous Extent of Galaxies and the Origin of Lyα Absorption Systems. IV. Lyα Absorbers Arising in a Galaxy Group. *A. Ortiz-Gill, K. M. Lanzetta, J. K. Webb, X. Barcons, & A. Fernández-Soto.* 523, 72 (1999)

LARA, L. B2 1144+35: A Giant Low-Power Radio Galaxy with Superluminal Motion. *G. Giovannini, G. B. Taylor, E. Arbizzani, M. Bondi, W. D. Cotton, L. Feretti, L. Lara, & T. Venturi.* 522, 101 (1999)

LAROS, J. See HURLEY, K., et al. A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes.

LAURENT-MUEHLEISEN, SALLY A. What Determines the Depth of Broad Absorption Lines? Keck HIRES Observations of BALQSO 1603+3002. *Nahum Arav, Robert H. Becker, Sally A. Laurent-Muehleisen, Michael D. Gregg, Richard L. White, Michael S. Brotherton, & Martijn de Kool.* 524, 566 (1999)

LAWLER, J. E. Absolute UV and Vacuum UV Oscillator Strengths for Ni II. *J. A. Fedchak & J. E. Lawler.* 523, 734 (1999)

LAZZATI, DAVIDE. The Brera Multiscale Wavelet *ROSAT* HRI Source Catalog. I. The Algorithm. *Davide Lazzati, Sergio Campana, Piero Rosati, Maria Rosa Panzera, & Gianpiero Tagliaferri.* 524, 414 (1999)

The Brera Multiscale Wavelet *ROSAT* HRI Source Catalog. II. Application to the HRI and First Results. *Sergio Campana, Davide Lazzati, Maria Rosa Panzera, & Gianpiero Tagliaferri.* 524, 423 (1999)

LECKRONE, DAVID S. Abundances of the Elements in Sharp-lined Early-Type Stars from *IUE* High-Dispersion Spectrograms. II. The Nitrogen Deficiency in Mercury-Manganese Stars. *Scott W. Roby, David S. Leckrone, & Saul J. Adelman.* 524, 974 (1999)

LEE, HYUNG MOK. Effects of Tidal Shocks on the Evolution of Globular Clusters. *Oleg Y. Gnedin, Hyung Mok Lee, & Jeremiah P. Ostriker.* 522, 935 (1999)

LEE, JEONG-EUN. Infrared Excess and Molecular Gas in the Galactic Worm GW 46.4+5.5. *Kee-Tae Kim, Jeong-Eun Lee, & Bon-Chul Koo.* 523, 306 (1999)

LEGGETT, S. K. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

LEHÁR, J. See FALCO, E. E., et al. Dust and Extinction Curves in Galaxies with $z > 0$: The Interstellar Medium of Gravitational Lens Galaxies.

See PENG, C. Y., et al. The Quasar Pair Q1634+267A,B and the Binary QSO versus Dark Lens Hypotheses.

LEHNERT, MATTHEW D. Very Extended X-Ray and Hα Emission in M82: Implications for the Superwind Phenomenon. *Matthew D. Lehnert, Timothy M. Heckman, & Kimberly A. Weaver.* 523, 575 (1999)

LEIBOWITZ, E. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

LEIGHLY, KAREN M. An *RXTE* Observation of NGC 6300: A New Bright Compton Reflection–dominated Seyfert 2 Galaxy. *Karen M. Leighly, Jules Halpern, Hisamitsu Awaki, Massimo Cappi, Shiro Ueno, & Joachim Siebert.* 522, 209 (1999)

The X-Ray Spectra and Spectral Variability of Intermediate-Type Seyfert Galaxies: *ASCA* Observations of NGC 4388 and ESO 103−G35. *Karl Forster, Karen M. Leighly, & Laura E. Kay.* 523, 521 (1999)

LEINERT, CH. See THOMPSON, D., et al. The Surface Density of Extremely Red Objects.

LÉPINE, SÉBASTIEN. First Direct Measurement of Acceleration in the Outflow of a Nova: U Scorpii (1999). *Sébastien Lépine, Michael M. Shara, Mario Livio, & David Zurek.* 522, L121 (1999)

LEPP, S. Rate Coefficients for Ro-vibrational Transitions in H_2 Due to Collisions with He. *N. Balakrishnan, M. Vieira, J. F. Babb, A. Dalgarno, J. F. Forrey, & S. Lepp.* 524, 1122 (1999)

LERY, THIBAUT. Ambipolar Diffusion in Young Stellar Object Jets. *Adam Frank, Thomas A. Gardiner, Guy Delemarter, Thibaut Lery, & Riccardo Betti.* 524, 947 (1999)

LESKE, R. A. See WIEDENBECK, M. E., et al. Constraints on the Time Delay between Nucleosynthesis and Cosmic-Ray Acceleration from Observations of Ni and Co.

LESTRADE, JOHN PATRICK. See MITROFANOV, IGOR G., et al. The Emission Time of Gamma-Ray Bursts.

LEVINE, A. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

LEVINE, A. M. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

LEVINE, ALAN M. Scattering and Iron Fluorescence Revealed during Absorption Dips in Circinus X-1. *Robert E. Shirey, Alan M. Levine, & Hale V. Bradt.* 524, 1048 (1999)

LEVINSON, AMIR. Transient Emission from Dissipative Fronts in Magnetized, Relativistic Outflows. II. Synchrotron Flares. *Amir Levinson.* 522, 93 (1999)

LI, DI. A New Method for Determining the Dust Temperature Distribution in Star-forming Regions. *Di Li, Paul F. Goldsmith, & Taoling Xie.* 522, 897 (1999)

LI, GANG. The MgH $B'\,^2\Sigma^+$–$X\,^2\Sigma^+$ Transition: A New Tool for Studying Magnesium Isotope Abundances. *Lloyd Wallace, Kenneth Hinkle, Gang Li, & Peter Bernath.* 524, 454 (1999)

LI, K. H. Optical Monitoring Sample of the GeV Gamma-Ray–loud Blazars. *G. Z. Xie, K. H. Li, X. Zhang, J. M. Bai, & W. W. Liu.* 522, 846 (1999)

LI, P. See HURLEY, K., et al. A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes.

LIDMAN, C. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

LIEBERT, JAMES. See BURGASSER, ADAM J., et al. Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey.

A Very Low Luminosity, Very Cool, DC White Dwarf. *Hugh C. Harris, Conard C. Dahn, Frederick J. Vrba, Arne A. Henden, James Liebert, Gary D. Schmidt, & I. Neill Reid.* 524, 1000 (1999)

LIJOWSKI, M. See WIEDENBECK, M. E., et al. Constraints on the Time Delay between Nucleosynthesis and Cosmic-Ray Acceleration from Observations of Ni and Co.

LIM, W. C. An Almost Isotropic Cosmic Microwave Temperature Does Not Imply an Almost Isotrpic Universe. *U. S. Nilsson, C. Uggla, J. Wainwright, & W. C. Lim.* 522, L1 (1999)

LIMONGI, MARCO. Intermediate-Mass Stars: Updated Models. *Inma Dominguez, Alessandro Chieffi, Marco Limongi, & Oscar Straniero.* 524, 226 (1999)

LIN, DOUG N. C. Dust Coagulation in Infalling Protostellar Envelopes. I. Compact Grains. *Gerhard Suttner, Harold W. Yorke, & Doug N. C. Lin.* 524, 857 (1999)

LIN, HUAN. Star Formation in Las Campanas Compact Groups. *Sahar S. Allam, Douglas L. Tucker, Huan Lin, & Yasuhiro Hashimoto.* 522, L89 (1999)

LINDLER, D. See SAHU, M. S., et al. The D/H Ratio in Interstallar Gas toward G191−B2B.

LINDLER, DON J. *Hubble Space Telescope* Space Telescope Imaging Spectrograph Coronagraphic Imaging of the Herbig AE Star AB Aurigae. *C. A. Grady, B. Woodgate, F. C. Bruhweiler, A. Boggess, Philip Plait, Don J. Lindler, M. Clampin, & P. Kalas.* 523, L151 (1999)

LINTON, M. G. Relationship of the Multimode Kink Instability to δ-Spot Formation. *M. G. Linton, G. H. Fisher, R. B. Dahlburg, & Y. Fan.* 522, 1190 (1999)

LIPKIN, Y. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

LITVAK, MAXIM L. See MITROFANOV, IGOR G., et al. The Emission Time of Gamma-Ray Bursts.

Average Cosmological Invariant Parameters of Cosmic Gamma-Ray Bursts. *Igor G. Mitrofanov, Dmitrij S. Anfimov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 192 (1999)

Average Emissivity Curve of BATSE Gamma-Ray Bursts with Different Intensities. *Igor G. Mitrofanov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 610 (1999)

LIU, SHENG-YUAN. Subarcsecond Resolution Observations of Sagittarius B2 at 85 GHz. *Sheng-Yuan Liu & Lewis E. Snyder.* 523, 683 (1999)

LIU, W. W. Optical Monitoring Sample of the GeV Gamma-Ray–loud Blazars. *G. Z. Xie, K. H. Li, X. Zhang, J. M. Bai, & W. W. Liu.* 522, 846 (1999)

LIU, X. S. The Blue Stragglers in M67 and Single Population Synthesis. *L. Deng, R. Chen, X. S. Liu, & J. S. Chen.* 524, 824 (1999)

LIU, X.-W. The Nature of the Diffuse Clumps and the X-Ray Companion of Markarian 273. *X.-Y. Xia, S. Mao, H. Wu, X.-W. Liu, Y. Gao, Z.-G. Deng, & Z.-L. Zou.* 524, 746 (1999)

LIVIO, MARIO. First Direct Measurement of Acceleration in the Outflow of a Nova: U Scorpii (1999). *Sébastien Lépine, Michael M. Shara, Mario Livio, & David Zurek.* 522, L121 (1999)

Vortices in Protoplanetary Disks. *Patrick Godon & Mario Livio.* 523, 350 (1999)

LOBEL, A. The Yellow Hypergiants HR 8752 and ρ Cassiopeiae near the Evolutionary Border of Instability. *G. Israelian, A. Lobel, & M. R. Schmidt.* 523, L145 (1999)

LOEB, ABRAHAM. The Photoevaporation of Dwarf Galaxies during Reionization. *Rennan Barkana & Abraham Loeb.* 523, 54 (1999)

Constraints on Off-Axis X-Ray Emission from Beamed Gamma-Ray Bursts. *Eric Woods & Abraham Loeb.* 523, 187 (1999)

Scattered Lyα Radiation around Sources before Cosmological Reionization. *Abraham Loeb & George B. Rybicki.* 524, 527 (1999)

LONGCOPE, D. W. Coronal Heating by Collision and Cancellation of Magnetic Elements. *D. W. Longcope & C. C. Kankelborg.* 524, 483 (1999)

LONGCOPE, DANA W. Statistical Properties of Magnetic Separators in Model Active Regions. *Brian T. Welsch & Dana W. Longcope.* 522, 1117 (1999)

LÓPEZ, J. A. Accretion Disks in Pre–Planetary Nebulae. *M. Reyes-Ruiz & J. A. López.* 524, 952 (1999)

LOREDO, T. J. Statistical Analysis of Spectral Line Candidates in Gamma-Ray Burst GRB 870303. *P. E. Freeman, C. Graziani, D. Q. Lamb, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 753 (1999)

Resonant Cyclotron Radiation Transfer Model Fits to Spectra from Gamma-Ray Burst GRB 870303. *P. E. Freeman, D. Q. Lamb, J. C. L. Wang, I. Wasserman, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 772 (1999)

LOVELACE, R. V. E. Eccentric Behavior of Disk Galaxies. *R. V. E. Lovelace, L. Zhang, D. A. Kornreich, & M. P. Haynes.* 524, 634 (1999)

LU, FANG-JUN. Emergent Spectra from Slim Accretion Disks in Active Galactic Nuclei. *Jian-Min Wang, Ewa Szuszkiewicz, Fang-Jun Lu, & You-Yuan Zhou.* 522, 839 (1999)

LU, JU-FU. Global Dynamics of Advection-dominated Accretion Revisited. *Ju-Fu Lu, Wei-Min Gu, & Feng Yuan.* 523, 340 (1999)

LUGINBUHL, C. See HURLEY, K., et al. A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes.

LUPTON, ROBERT H. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

LYNE, A. G. The Triple Pulsar System PSR B1620−26 in M4. *S. E. Thorsett, Z. Arzoumanian, F. Camilo, & A. G. Lyne.* 523, 763 (1999)

LYON, R. G. The [N II] Kinematics of R Aquarii. *J. M. Hollis, S. N. Vogel, D. Van Buren, J. P. Strong, R. G. Lyon, & J. E. Dorband.* 522, 297 (1999)

MA, CHUNG-PEI. Galaxy Clustering and Large-Scale Structure from $z = 0.2$ to $z = 0.5$ in Two Norris Redshift Surveys. *Todd A. Small, Chung-Pei Ma, Wallace L. W. Sargent, & Donald Hamilton.* 524, 31 (1999)

MACCACARO, TOMMASO. A Medium Survey of the Hard X-Ray Sky with *ASCA*. II. The Source's Broadband X-Ray Spectral Properties. *Roberto Della Ceca, GianMarco Castelli, Valentina Braito, Ilaria Cagnoni, & Tommaso Maccacaro.* 524, 674 (1999)

MACCHETTO, F. Evolution of the Light Echo of SN 1991T. *W. B. Sparks, F. Macchetto, N. Panagia, F. R. Boffi, D. Branch, M. L. Hazen, & M. Della Valle.* 523, 585 (1999)

MACCHETTO, F. D. Cepheid Calibration of the Peak Brightness of Type Ia Supernovae. IX. SN 1989B in NGC 3627. *A. Saha, Allan Sandage, G. A. Tammann, Lukas Labhardt, F. D. Macchetto, & N. Panagia.* 522, 802 (1999)

MACFADYEN, A. I. Collapsars: Gamma-Ray Bursts and Explosions in "Failed Supernovae." *A. I. MacFadyen & S. E. Woosley.* 524, 262 (1999)

MACIEJEWSKI, WITOLD. Modeling W44 as a Supernova Remnant in a Density Gradient with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. I. The Analytical Model. *Donald P. Cox, R. L. Shelton, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka.* 524, 179 (1999)

Modeling W44 as a Supernova Remnant in a Density Gradient, with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. II. The Hydrodynamic Models. *R. L. Shelton, Donald P. Cox, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka.* 524, 192 (1999)

MAC LOW, MORDECAI-MARK. The Energy Dissipation Rate of Supersonic, Magnetohydrodynamic Turbulence in Molecular Clouds. *Mordecai-Mark Mac Low.* 524, 169 (1999)

MACRI, LUCAS. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

MADAU, PIERO. Photon-conserving Radiative Transfer around Point Sources in Multidimensional Numerical Cosmology. *Tom Abel, Michael L. Norman, & Piero Madau.* 523, 66 (1999)

MADEJSKI, GREG. X-Ray Spectral Variability of PKS 2005−489 during the Spectacular 1998 November Flare. *Eric S. Perlman, Greg Madejski, John T. Stocke, & Travis A. Rector.* 523, L11 (1999)

MADORE, BARRY F. A Cepheid Distance to NGC 4603 in Centaurus. *Jeffrey A. Newman, Stephen E. Zepf, Marc Davis, Wendy L. Freedman, Barry F. Madore, Peter B. Stetson, N. Silbermann, & Randy Phelps.* 523, 506 (1999)

See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

MAEZAWA, HIROYUKI. Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud. *Hiroyuki Maezawa, Masafumi Ikeda, Tetsuya Ito, Gaku Saito, Yutaro Sekimoto, Satoshi Yamamoto, Ken'ichi Tatematsu, Yuji Arikawa, Yoshiyuki Aso, Takashi Noguchi, Sheng-Cai Shi, Keisuke Miyazawa, Shuji Saito, Hiroyuki Ozeki, Hideo Fujiwara, Masatoshi Ohishi, & Junji Inatani.* 524, L129 (1999)

MAGARA, TETSUYA. Photospheric and Chromospheric Gas Motions around a Dark Filament. *Tetsuya Magara & Reizaburo Kitai.* 524, 469 (1999)

MAGEE, DANIEL. The Velocity Dispersion of MS 1054−03: A Massive Galaxy Cluster at High Redshift. *Kim-Vy H. Tran, Daniel D. Kelson, Peter van Dokkum, Marijn Franx, Garth D. Illingworth, & Daniel Magee.* 522, 39 (1999)

MAGRIS, G. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

MAIOLINO, R. The Distribution of Absorbing Column Densities among Seyfert 2 Galaxies. *G. Risaliti, R. Maiolino, & M. Salvati.* 522, 157 (1999)

MAKISHIMA, KAZUO. The *ASCA* Medium-Sensitivity Survey (The GIS Catalog Project): Source Counts and Evidence for Emerging Population of Hard Sources. *Yoshihiro Ueda, Tadayuki Takahashi, Yoshitaka Ishisaki, Takaya Ohashi, & Kazuo Makishima.* 524, L11 (1999)

MALIN, D. F. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

MALONEY, PHILIP R. Warm Gas and Ionizing Photons in the Local Group. *Philip R. Maloney & J. Bland-Hawthorn.* 522, L81 (1999)

MAMPASO, ANTONIO. Jets, Knots, and Tails in Planetary Nebulae: NGC 3918, K1-2, and Wray 17-1. *Romano L. M. Corradi, Mario Perinotto, Eva Villaver, Antonio Mampaso, & Denise R. Gonçalves.* 523, 721 (1999)

MANCHADO, A. On the Chemical Abundances of Multiple-Shell Planetary Nebulae with Halos. *M. A. Guerrero & A. Manchado.* 522, 378 (1999)

MANCHESTER, R. N. Parallax of PSR J1744−1134 and the Local Interstellar Medium. *M. Toscano, M. C. Britton, R. N. Manchester, M. Bailes, J. S. Sandhu, S. R. Kulkarni, & S. B. Anderson.* 523, L171 (1999)

MANGALAM, A. Constrained Violent Relaxation to a Spherical Halo. *A. Mangalam, R. Nityananda, & S. Sridhar.* 524, 623 (1999)

MAO, S. The Nature of the Diffuse Clumps and the X-Ray Companion of Markarian 273. *X.-Y. Xia, S. Mao, H. Wu, X.-W. Liu, Y. Gao, Z.-G. Deng, & Z.-L. Zou.* 524, 746 (1999)

MARCHENKO, SERGEY V. Dust Formation in the Hot Massive Binary HD 192641 = WR 137 (WC 7+OB). *Sergey V. Marchenko, Anthony F. J. Moffat, & Yves Grosdidier.* 522, 433 (1999)

MARGON, BRUCE. Infrared Candidates for the Intense Galactic X-Ray Source GX 17+2. *Eric W. Deutsch, Bruce Margon, Scott F. Anderson, Stefanie Wachter, & W. M. Goss.* 524, 406 (1999)

MARKEVITCH, MAXIM. A Differential X-Ray Gunn-Peterson Test Using a Giant Cluster Filament. *Maxim Markevitch.* 522, L13 (1999)

MARKIEL, J. ANDREW. Solar Interface Dynamo Models with a Realistic Rotation Profile. *J. Andrew Markiel & John H. Thomas.* 523, 827 (1999)

MARKOFF, SERA. High-Energy Emission from Relativistic Particles in Sagittarius A*. *Sera Markoff, Fulvio Melia, & Ina Sarcevic.* 522, 870 (1999)

MARKZE, R. O. See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

MARLOWE, AMANDA T. The Taxonomy of Blue Amorphous Galaxies. II. Structure and Evolution. *Amanda T. Marlowe, Gerhardt R. Meurer, & Timothy M. Heckman.* 522, 183 (1999)

MARSCHER, ALAN P. Outburst in the Polarized Structure of the Compact Jet of 3C 454.3. *José-Louis Gómez, Alan P. Marscher, & Antonio Alberdi.* 522, 74 (1999)

MARTÍ, J. M. High-Resolution Three-dimensional Simulations of Relativistic Jets. *M. A. Aloy, J. M. Ibáñez, J. M. Martí, J.-L. Gómez, & E. Müller.* 523, L125 (1999)

MARTÍN, E. L. An L-Type Substellar Object in Orion: Reaching the Mass Boundary between Brown Dwarfs and Giant Planets. *M. R. Zapatero Osorio, V. J. S. Béjar, R. Rebolo, E. L. Martín, & G. Basri.* 524, L115 (1999)

MARTIN, R. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

MARTÍNEZ, VICENT J. Comparing Estimators of the Galaxy Correlation Function. *María-Jesús Pons-Bordería, Vicent J. Martínez, Dietrich Stoyan, Helga Stoyan, & Enn Saar.* 523, 480 (1999)

MASETTI, N. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

See WIJERS, R. A. M. J., et al. Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope.

MASON, HELEN E. Variation of Thermal Structure with Height of a Solar Active Region Derived from *SOHO* CDS and *Yohkoh* BCS Observations. *Alphonse C. Sterling, C. D. Pike, Helen E. Mason, Tetsuya Watanabe, & Spiro K. Antiochos.* 524, 1096 (1999)

MASSA, DERCK. Toward an Orbit for the High-Luminosity Cepheid T Monocerotis. *Nancy Remage Evans, Kenneth Carpenter, Richard Robinson, Derck Massa, Glenn M. Wahlgren, Jozsef Vinko, & Laszlo Szabados.* 524, 379 (1999)

MASTRODEMOS, NIKOS. Bipolar Pre–Planetary Nebulae: Hydrodynamics of Dusty Winds in Binary Systems. II. Morphology of the Circumstellar Envelopes. *Nikos Mastrodemos & Mark Morris.* 523, 357 (1999)

MATEO, MARIO. A New Culprit in the Second-Parameter Problem in the Sculptor Dwarf Spheroidal Galaxy? *Denise Hurley-Keller, Mario Mateo, & Eva K. Grebel.* 523, L25 (1999)

MATEU, J. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

MATHIOUDAKIS, M. The Radial and Angular Variation of the Electron Density in the Solar Corona. *P. T. Gallagher, M. Mathioudakis, F. P. Keenan, K. J. H. Phillips, & K. Tsinganos.* 524, L133 (1999)

MATSUBARA, Y. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

MATTHAEUS, W. H. Coronal Heating by Magnetohydrodynamic Turbulence Driven by Reflected Low-Frequency Waves. *W. H. Matthaeus, G. P. Zank, S. Oughton, D. J. Mullan, & P. Dmitruk.* 523, L93 (1999)

MATZ, S. M. See BRIGGS, M. S., et al. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*.

MAYYA, Y. D. Chemical Abundance Gradients in the Star-forming Ring Galaxies. *Vladimir Korchagin, Eduard Vorobyov, & Y. D. Mayya.* 522, 767 (1999)

MAZEH, TSEVI. Analysis of the *Hipparcos* Measurements of υ Andromedae: A Mass Estimate of Its Outermost Known Planetary Companion. *Tsevi Mazeh, Shay Zucker, Andrea Dalla Torre, & Floor van Leeuwen.* 522, L149 (1999)

MAZETS, E. Where Is SGR 1806−20? *K. Hurley, C. Kouveliotou, T. Cline, E. Mazets, S. Golenetskii, D. D. Frederiks, & J. van Paradijs.* 523, L37 (1999)

MAZZITELLI, ITALO. Modeling Lithium-rich Carbon Stars in the Large Magellanic Cloud: An Independent Distance Indicator? *Paolo Ventura, Francesca D'Antona, & Italo Mazzitelli.* 524, L111 (1999)

MCCALL, B. J. Observations of H_3^+ in Dense Molecular Clouds. *B. J. McCall, T. R. Geballe, K. H. Hinkle, & T. Oka.* 522, 338 (1999)

MCCARTHY, M. C. Laser Spectroscopy of the Carbon Chains HC_7H and HC_9H. *C. D. Ball, M. C. McCarthy, & P. Thaddeus.* 523, L89 (1999)

MCCARTHY, P. J. See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

MCCLINTOCK, JEFFREY E. *RXTE* Observations of 0.1–300 Hz Quasi-periodic Oscillations in the Microquasar GRO J1655−40. *Ronald A. Remillard, Edward H. Morgan, Jeffrey E. McClintock, Charles D. Bailyn, & Jerome A. Orosz.* 522, 397 (1999)

MCCONNELL, D. See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

MCCONNELL, M. L. See BRIGGS, M. S., et al. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*.

MCGAUGH, STACY S. Distinguishing between Cold Dark Matter and Modified Newtonian Dynamics: Predictions for the Microwave Background. *Stacy S. McGaugh.* 523, L99 (1999)

MCKEE, CHRISTOPHER F. Multipressure Polytropes as Models for the Structure and Stability of Molecular Clouds. I. Theory. *Christopher F. McKee & John H. Holliman II.* 522, 313 (1999)

MCLEOD, B. A. See FALCO, E. E., et al. Dust and Extinction Curves in Galaxies with $z > 0$: The Interstellar Medium of Gravitational Lens Galaxies.

See PENG, C. Y., et al. The Quasar Pair Q1634+267A,B and the Binary QSO versus Dark Lens Hypotheses.

MCMAHON, R. G. See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

MCMAHON, RICHARD G. An Extremely Luminous Galaxy at $z = 5.74$. *Esther M. Hu, Richard G. McMahon, & Lennox L. Cowie.* 522, L9 (1999)

MCMASTER, M. Evidence for a Population of Numerous Binaries with Comparably Bright Components among *Hipparcos* "Single" F Stars. *A. A. Suchkov & M. McMaster.* 524, L99 (1999)

MEDVEDEV, M. V. Evolution of Nonlinear Alfvén Waves in Streaming Inhomogeneous Plasmas. *B. Buti, V. L. Galinski, V. I. Shevchenko, G. S. Lakhina, B. T. Tsurutani, B. E. Goldstein, P. Diamond, & M. V. Medvedev.* 523, 849 (1999)

MEEGAN, C. See HURLEY, K., et al. A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes.

See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

MEEGAN, CHARLES A. See MITROFANOV, IGOR G., et al. The Emission Time of Gamma-Ray Bursts.

Average Cosmological Invariant Parameters of Cosmic Gamma-Ray Bursts. *Igor G. Mitrofanov, Dmitrij S. Anfimov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 192 (1999)

Average Emissivity Curve of BATSE Gamma-Ray Bursts with Different Intensities. *Igor G. Mitrofanov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 610 (1999)

MEIER, D. L. A Magnetically Switched, Rotating Black Hole Model for the Production of Extragalactic Radio Jets and the Fanaroff and Riley Class Division. *D. L. Meier.* 522, 753 (1999)

MEISENHEIMER, K. See THOMPSON, D., et al. The Surface Density of Extremely Red Objects.

MELIA, FULVIO. High-Energy Emission from Relativistic Particles in Sagittarius A*. *Sera Markoff, Fulvio Melia, & Ina Sarcevic.* 522, 870 (1999)

Accretion Disk Evolution with Wind Infall. II. Results of Three-dimensional Hydrodynamical Simulations with an Illustrative Application to Sagittarius A*. *Robert Coker, Fulvio Melia, & Heino Falcke.* 523, 642 (1999)

MÉNDEZ, RENÉ A. A Large Local Rotational Speed for the Galaxy Found from Proper Motions: Implications for the Mass of the Milky Way. *René A. Méndez, Imants Platais, Terrence M. Girard, Vera Kozhurina-Platais, & William F. van Altena.* 524, L39 (1999)

MENNELLA, V. Activation of the 3.4 Micron Band in Carbon Grains by Exposure to Atomic Hydrogen. *V. Mennella, J. R. Brucato, L. Colangeli, & P. Palumbo.* 524, L71 (1999)

MENZIES, J. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

MÉSZÁROS, P. Power Density Spectra of Gamma-Ray Bursts in the Internal Shock Model. *A. Panaitescu, M. Spada, & P. Mészáros.* 522, L105 (1999)

METCALF, THOMAS R. Coronal Trapping of Energetic Flare Particles: *Yohkoh*/HXT Observations. *Thomas R. Metcalf & David Alexander.* 522, 1108 (1999)

MEURER, GERHARDT R. The Taxonomy of Blue Amorphous Galaxies. II. Structure and Evolution. *Amanda T. Marlowe, Gerhardt R. Meurer, & Timothy M. Heckman.* 522, 183 (1999)

MEWALDT, R. A. See WIEDENBECK, M. E., et al. Constraints on the Time Delay between Nucleosynthesis and Cosmic-Ray Acceleration from Observations of Ni and Co.

MEYER, DAVID M. The Abundance of Interstellar Tin and Cadmium. *Ulysses J. Sofia, David M. Meyer, & Jason A. Cardelli.* 522, L137 (1999)

MICROLENSING PLANET SEARCH COLLABORATIO, THE. See RHIE, S. H., et al. Observations of the Binary Microlens Event MACHO 98-SMC-1 by the Microlensing Planet Search Collaboration.

MIESCH, MARK S. Velocity Field Statistics in Star-forming Regions. I. Centroid Velocity Observations. *Mark S. Miesch, John Scalo, & John Bally.* 524, 895 (1999)

MIHARA, T. See SANTANGELO, A., et al. A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features.

MILLER, A. D. A Measurement of the Angular Power Spectrum of the Cosmic Microwave Background from $l = 100$ to 400. *A. D. Miller, R. Caldwell, M. J. Devlin, W. B. Dorwart, T. Herbig, M. R. Nolta, L. A. Page, J. Puchalla, E. Torbet, & H. T. Tran.* 524, L1 (1999)

MILLER, B. Beams and Cones from Aligned Rotators. *B. J. Eastlund & B. Miller.* 523, L41 (1999)

MILLER, CHRISTOPHER J. Projection, Spatial Correlations, and Anisotropies in a Large and Complete Sample of Abell Clusters. *Christopher J. Miller, David J. Batuski, Kurt A. Slinglend, & John M. Hill.* 523, 492 (1999)

MILLER, S. H_2 Quadrupole and H_3^+ Emission from Uranus: The Uranian Thermosphere, Ionosphere, and Aurora. *L. M. Trafton, S. Miller, T. R. Geballe, J. Tennyson, & G. E. Ballester.* 524, 1059 (1999)

MINCHIN, R. F. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

MITROFANOV, IGOR G. The Emission Time of Gamma-Ray Bursts. *Igor G. Mitrofanov, Dmitrij S. Anfimov, Maxim L. Litvak, Anton B. Sanin, Yurij Yu. Saevich, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, Thomas M. Koshut, Gerald J. Fishman, Charles A. Meegan, & John Patrick Lestrade.* 522, 1069 (1999)

Average Cosmological Invariant Parameters of Cosmic Gamma-Ray Bursts. *Igor G. Mitrofanov, Dmitrij S. Anfimov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 192 (1999)

Average Emissivity Curve of BATSE Gamma-Ray Bursts with Different Intensities. *Igor G. Mitrofanov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 610 (1999)

MITSUDA, KAZUHISA. Spin-down of the 65 Millisecond X-Ray Pulsar in the Supernova Remnant G11.2−0.3. *Ken'ichi Torii, Hiroshi Tsunemi, Tadayasu Dotani, Kazuhisa Mitsuda, Nobuyuki Kawai, Kenzo Kinugasa, Yoshitaka Saito, & Shinpei Shibata.* 523, L69 (1999)

MIYAZAWA, KEISUKE. See MAEZAWA, HIROYUKI, et al. Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud.

MOFFAT, ANTHONY F. J. Dust Formation in the Hot Massive Binary HD 192641 = WR 137 (WC 7+OB). *Sergey V. Marchenko, Anthony F. J. Moffat, & Yves Grosdidier.* 522, 433 (1999)

MOFFETT, DAVID A. Polarimetric Properties of the Crab Pulsar between 1.4 and 8.4 GHz. *David A. Moffett & Timothy H. Hankins.* 522, 1046 (1999)

MOLNAR, S. M. Inverse Compton Scattering in Mildly Relativistic Plasma. *S. M. Molnar & M. Birkinshaw.* 523, 78 (1999)

MONET, DAVID G. See BURGASSER, ADAM J., et al. Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey.

MONIER, ERIC M. *Hubble Space Telescope* Faint Object Spectrograph Observations of a Unique Grouping of Five QSOs: The Sizes and Shapes of Low-z Lyα Forest Absorbers. *Eric M. Monier, David A. Turnshek, & Cyril Hazard.* 522, 627 (1999)

MOOKERJEA, B. Far-Infrared Observations of the Galactic Star-forming Regions Associated with IRAS 00339+6312 and RAFGL 5111. *B. Mookerjea, S. K. Ghosh, A. D. Karnik, T. N. Rengarajan, S. N. Tandon, & R. P. Verma.* 522, 285 (1999)

MOORE, BEN. Dark Matter Substructure within Galactic Halos. *Ben Moore, Sebastiano Ghigna, Fabio Governato, George Lake, Thomas Quinn, Joachim Stadel, & Paolo Tozzi.* 524, L19 (1999)

MORENO, EDMUNDO. The Kinematics of Stars Emerging from Expanding Shells: An Analysis of the Gould Belt. *Edmundo Moreno, Emilio J. Alfaro, & José Franco.* 522, 276 (1999)

MORGAN, EDWARD H. *RXTE* Observations of 0.1–300 Hz Quasi-periodic Oscillations in the Microquasar GRO J1655−40. *Ronald A. Remillard, Edward H. Morgan, Jeffrey E. McClintock, Charles D. Bailyn, & Jerome A. Orosz.* 522, 397 (1999)

MORIARTY-SCHIEVEN, G. H. See KULKARNI, S. R., et al. Discovery of a Radio Flare from GRB 990123.

MORRIS, MARK. Bipolar Pre–Planetary Nebulae: Hydrodynamics of Dusty Winds in Binary Systems. II. Morphology of the Circumstellar Envelopes. *Nikos Mastrodemos & Mark Morris.* 523, 357 (1999)

MORSINK, SHARON M. Correlations in the Quasi-periodic Oscillation Frequencies of Low-Mass X-Ray Binaries and the Relativistic Precession Model. *Luigi Stella, Mario Vietri, & Sharon M. Morsink.* 524, L63 (1999)

MOULD, J. See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

MOULD, J. R. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

MOULD, JEREMY R. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

MÜLLER, E. High-Resolution Three-dimensional Simulations of Relativistic Jets. *M. A. Aloy, J. M. Ibáñez, J. M. Martí, J.-L. Gómez, & E. Müller.* 523, L125 (1999)

MUFFSON, S. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

MULCAHEY, JOHN S. *Hubble Space Telescope*/Faint Object Spectrograph Spectroscopy of Spatially Resolved Narrow-Line Regions in the Seyfert 2 Galaxies NGC 2110 and NGC 5929. *Pierre Ferruit, Andrew S. Wilson, Mark Whittle, Chris Simpson, John S. Mulcahey, & Gary J. Ferland.* 523, 147 (1999)

MULLAN, D. J. Coronal Heating by Magnetohydrodynamic Turbulence Driven by Reflected Low-Frequency Waves. *W. H. Matthaeus, G. P. Zank, S. Oughton, D. J. Mullan, & P. Dmitruk.* 523, L93 (1999)

MUNN, JEFFREY A. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

MUÑOZ, J. A. See FALCO, E. E., et al. Dust and Extinction Curves in Galaxies with $z > 0$: The Interstellar Medium of Gravitational Lens Galaxies.

See PENG, C. Y., et al. The Quasar Pair Q1634+267A,B and the Binary QSO versus Dark Lens Hypotheses.

MURAKAMI, K. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

MURAKAMI, T. See HURLEY, K., et al. A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes.

Statistical Analysis of Spectral Line Candidates in Gamma-Ray Burst GRB 870303. *P. E. Freeman, C. Graziani, D. Q. Lamb, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 753 (1999)

Resonant Cyclotron Radiation Transfer Model Fits to Spectra from Gamma-Ray Burst GRB 870303. *P. E. Freeman, D. Q. Lamb, J. C. L. Wang, I. Wasserman, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 772 (1999)

MURAKAMI, TOSHIO. See WOODS, PETER M., et al. Variable Spin-down in the Soft Gamma Repeater SGR 1900+14 and Correlations with Burst Activity.

MURANTE, G. Cluster Mass Function in Mixed Models. *A. Gardini, S. A. Bonometto, & G. Murante.* 524, 510 (1999)

MURPHY, R. J. See BRIGGS, M. S., et al. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*.

MURTHY, JAYANT. An Analysis of 17 Years of *Voyager* Observations of the Diffuse Far-Ultraviolet Radiation Field. *Jayant Murthy, Doyle Hall, Matthew Earl, R. C. Henry, & J. B. Holberg.* 522, 904 (1999)

MUSHOTZKY, R. F. The Properties of the Relativistic Iron K-Line in NGC 3516. *K. Nandra, I. M. George, R. F. Mushotzky, T. J. Turner, & T. Yaqoob.* 523, L17 (1999)

MUSIELAK, Z. E. Two-Component Theoretical Chromosphere Models for K Dwarfs of Different Magnetic Activity: Exploring the Ca II Emission–Stellar Rotation Relationship. *M. Cuntz, W. Rammacher, P. Ulmschneider, Z. E. Musielak, & S. H. Saar.* 522, 1053 (1999)

MUSSER, J. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

MYERS, P. C. On the Turbulent Velocity Dispersion in Molecular Clouds. *P. C. Myers & C. F. Gammie.* 522, L141 (1999)

CO Depletion in the Starless Cloud Core L1544. *P. Caselli, C. M. Walmsley, M. Tafalla, L. Dore, & P. C. Myers.* 523, L165 (1999)

NAAB, THORSTEN. On the Formation of Boxy and Disky Elliptical Galaxies. *Thorsten Naab, Adreas Burkert, & Lars Hernquist.* 523, L133 (1999)

NABER, R. M. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

NAGANO, M. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

NAGASE, F. Detection of Hard X-Rays from a Class I Protostar in the HH 24-26 Region in the Orion Molecular Cloud. *H. Ozawa, F. Nagase, Y. Ueda, T. Dotani, & M. Ishida.* 523, L81 (1999)

NAGASE, FUMIAKI. Discovery of 715 Second Pulsations from the Faint X-Ray Source AX J170006−4157. *Ken'ichi Torii, Mutsumi Sugizaki, Takayoshi Kohmura, Takao Endo, & Fumiaki Nagase.* 523, L65 (1999)

Simultaneous Radio and X-Ray Observations of the Wolf-Rayet Star WR 147. *Stephen L. Skinner, Masayuki Itoh, Fumiaki Nagase, & Svetozar A. Zhekov.* 524, 394 (1999)

NAIR, VIBHAT. Geometric Distortion of the Correlation Function of Lyman-Break Galaxies. *Vibhat Nair.* 522, 569 (1999)

NAKAMURA, TAKASHI. Off-Axis Emission from the Beamed Afterglow of Gamma-Ray Bursts and a Possible Interpretation of the Slowly Declining X-Ray Afterglow of GRB 980425. *Takashi Nakamura.* 522, L101 (1999)

NAKAYAMA, KUNJI. Statistical Theory of Anisotropic Magnetohydrodynamic Turbulence: An Approach to Strong Shear Alfvén Turbulence by Direct-Interaction Approximation. *Kunji Nakayama.* 523, 315 (1999)

NANDRA, K. The Properties of the Relativistic Iron K-Line in NGC 3516. *K. Nandra, I. M. George, R. F. Mushotzky, T. J. Turner, & T. Yaqoob.* 523, L17 (1999)

On X-Ray Variability in Seyfert Galaxies. *T. J. Turner, I. M. George, K. Nandra, & D. Turcan.* 524, 667 (1999)

NARANJO, O. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

NARAYANAN, VIJAY K. Correlated Errors in *Hipparcos* Parallaxes toward the Pleiades and the Hyades. *Vijay K. Narayanan & Andrew Gould.* 523, 328 (1999)

NATALUCCI, L. A New Bursting X-Ray Transient: SAX J1750.8−2900. *L. Natalucci, R. Cornelisse, A. Bazzano, M. Cocchi, P. Ubertini, J. Heise, J. J. M. in 't Zand, & E. Kuulkers.* 523, L45 (1999)

NATARJAN, PRIYAMVADA. The Blandford-Znajek Mechanism and the Emission from Isolated Accreting Black Holes. *Philip J. Armitage & Priyamvada Natarjan.* 523, L7 (1999)

NAYA, J. E. Transient Gamma-Ray Observations of Gamma-Ray Lines from Novae. I. Limits on the Positron Annihilation Line in Five Individual Novae. *M. J. Harris, J. E. Naya, B. J. Teegarden, T. L. Cline, N. Gehrels, D. M. Palmer, R. Ramaty, & H. Seifert.* 522, 424 (1999)

NELSON, RICHARD P. On the Stability and Evolution of Isolated Bok Globules. *Richard P. Nelson & William D. Langer.* 524, 923 (1999)

NETZER, HAGAI. Modeling Variable Emission Lines in Active Galactic Nuclei: Method and Application to NGC 5548. *Shai Kaspi & Hagai Netzer.* 524, 71 (1999)

NEWBERG, HEIDI JO. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

NEWMAN, JEFFREY A. A Cepheid Distance to NGC 4603 in Centaurus. *Jeffrey A. Newman, Stephen E. Zepf, Marc Davis, Wendy L. Freedman, Barry F. Madore, Peter B. Stetson, N. Silbermann, & Randy Phelps.* 523, 506 (1999)

NICASTRO, L. See WUERS, R. A. M. J., et al. Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope.

NIEMEYER, J. C. Can Deflagration-Detonation Transitions Occur in Type Ia Supernovae? *J. C. Niemeyer.* 523, L57 (1999)

Small-Scale Interaction of Turbulence with Thermonuclear Flames in Type Ia Supernovae. *J. C. Niemeyer, W. K. Bushe, & G. R. Ruetsch.* 524, 290 (1999)

NIHENSON, PETER. An Upper Limit on the Reflected Light from the Planet Orbiting the Star τ Bootis. *David Charbonneau, Robert W. Noyes, Sylvain G. Korzennik, Peter Nihenson, Saurabh Jha, Steven S. Vogt, & Robert I. Kibrick.* 522, L145 (1999)

NILSSON, U. S. An Almost Isotropic Cosmic Microwave Temperature Does Not Imply an Almost Isotrpic Universe. *U. S. Nilsson, C. Uggla, J. Wainwright, & W. C. Lim.* 522, L1 (1999)

NISHI, RYOICHI. Formation and Disruption of Cosmolgical Low-Mass Objects. *Ryoichi Nishi & Hajime Susa.* 523, L103 (1999)

NISHIKAWA, D. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

NITTA, N. Radio and X-Ray Imaging Observations of a Continuum Burst. *M. R. Kundu, J. P. Raulin, N. Nitta, & A. Raoult.* 522, 1100 (1999)

NITYANANDA, R. Constrained Violent Relaxation to a Spherical Halo. *A. Mangalam, R. Nityananda, & S. Sridhar.* 524, 623 (1999)

NOGUCHI, TAKASHI. See MAEZAWA, HIROYUKI, et al. Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud.

NOLTA, M. R. See MILLER, A. D., et al. A Measurement of the Angular Power Spectrum of the Cosmic Microwave Background from $l = 100$ to 400.

NOMOTO, KEN'ICHI. A Wide Symbiotic Channel to Type Ia Supernovae. *Izumi Hachisu, Mariko Kato, & Ken'ichi Nomoto.* 522, 487 (1999)

The Origin of the Diversity of Type Ia Supernovae and the Environmental Effects. *Hideyuki Umeda, Ken'ichi Nomoto, Chiaki Kobayashi, Izumi Hachisu, & Mariko Kato.* 522, L43 (1999)

Nucleosynthesis on ONeMg Novae: Models versus Observations to Constrain the Masses of ONeMg White Dwarfs and Their Envelopes. *Shinya Wanajo, Masa-aki Hashimoto, & Ken'ichi Nomoto.* 523, 409 (1999)

NORMAN, MICHAEL L. Photon-conserving Radiative Transfer around Point Sources in Multidimensional Numerical Cosmology. *Tom Abel, Michael L. Norman, & Piero Madau.* 523, 66 (1999)

NORRIS, JOHN E. The Spite Lithium Plateau: Ultrathin but Postprimordial. *Sean G. Ryan, John E. Norris, & Timothy C. Beers.* 523, 654 (1999)

NOWAK, MICHAEL A. Low-Luminosity States of the Black Hole Candidate GX 339−4. I. *ASCA* and Simultaneous Radio/*RXTE* Observations. *Jörn Wilms, Michael A. Nowak, James B. Dove, Robert P. Fender, & Tiziana Di Matteo.* 522, 460 (1999)

On the Enigmatic X-Ray Source V1408 Aquilae (=4U 1957+11). *Michael A. Nowak & Jörn Wilms.* 522, 476 (1999)

NOYES, ROBERT W. An Upper Limit on the Reflected Light from the Planet Orbiting the Star τ Bootis. *David Charbonneau, Robert W. Noyes, Sylvain G. Korzennik, Peter Nihenson, Saurabh Jha, Steven S. Vogt, & Robert I. Kibrick.* 522, L145 (1999)

O'BRIEN, P. T. NGC 3516: The Long-Term Variability of the Active Galactic Nucleus Emission-Line and Absorption-Line Regions. *M. R. Goad, A. P. Koratkar, J. Kim-Quijano, K. T. Korista, P. T. O'Brien, & D. J. Axon.* 524, 707 (1999)

O'DEA, C. P. Neutral Hydrogen (21 Centimeter) Absorption in Seyfert Galaxies: Evidence for Free-Free Absorption and Subkiloparsec Gaseous Disks. *J. F. Gallimore, S. A. Baum, C. P. O'Dea, A. Pedlar, & E. Brinks.* 524, 684 (1999)

OEMLER, A. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

OHASHI, T. Temperature Variation in the Cluster of Galaxies Abell 115 Studied with *ASCA*. *R. Shibata, H. Honda, M. Ishida, T. Ohashi, & K. Yamashita.* 524, 603 (1999)

OHASHI, TAKAYA. The *ASCA* Medium-Sensitivity Survey (The GIS Catalog Project): Source Counts and Evidence for Emerging Population of Hard Sources. *Yoshihiro Ueda, Tadayuki Takahashi, Yoshitaka Ishisaki, Takaya Ohashi, & Kazuo Makishima.* 524, L11 (1999)

OHISHI, MASATOSHI. See MAEZAWA, HIROYUKI, et al. Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud.

OHOKA, H. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

OHYAMA, YOUICHI. ^{13}CO $J = 1$–0 Depression in Luminous Starburst Mergers, Revisited. *Yoshiaki Taniguchi, Youichi Ohyama, & D. B. Sanders.* 522, 214 (1999)

OKA, T. Observations of H_3^+ in Dense Molecular Clouds. *B. J. McCall, T. R. Geballe, K. H. Hinkle, & T. Oka.* 522, 338 (1999)

OLIVER, R. Discovery of the Near 158 Day Periodicity in Group Sunspot Numbers during the Eighteenth Century. *J. L. Ballester, R. Oliver, & F. Baudin.* 522, L153 (1999)

OLUSEYI, HAKEEM M. Observation and Modeling of the Solar Transition Region. I. Multi-Spectral Solar Telescope Array Observations. *Hakeem M. Oluseyi, A. B. C. Walker II, Jason Porter, Richard B. Hoover, & Troy W. Barbee, Jr.* 524, 1105 (1999)

OOSTERBROEK, T. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

See SANTANGELO, A., et al. A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features.

OOSTERLOO, T. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

ORAN, E. S. Jet-induced Explosions of Core Collapse Supernovae. *A. M. Khokhlov, P. A. Höflich, E. S. Oran, J. C. Wheeler, L. Wang, & A. Yu. Chtchelkanova.* 524, L107 (1999)

ORLANDINI, M. See SANTANGELO, A., et al. A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features.

OROSZ, JEROME A. *RXTE* Observations of 0.1–300 Hz Quasi-periodic Oscillations in the Microquasar GRO J1655−40. *Ronald A. Remillard, Edward H. Morgan, Jeffrey E. McClintock, Charles D. Bailyn, & Jerome A. Orosz.* 522, 397 (1999)

ORTIZ-GILL, A. The Gaseous Extent of Galaxies and the Origin of Lyα Absorption Systems. IV. Lyα Absorbers Arising in a Galaxy Group. *A. Ortiz-Gill, K. M. Lanzetta, J. K. Webb, X. Barcons, & A. Fernández-Soto.* 523, 72 (1999)

OSHEROVICH, VLADIMIR. Kilohertz Quasi-periodic Oscillations in Neutron Star Binaries Modeled as Keplerian Oscillations in a Rotating Frame of Reference. *Vladimir Osherovich & Lev Titarchuk.* 522, L113 (1999)

Interpretation of ~35 Hz QPO in the Atoll Source 4U 1702−42 as a Low Branch of the Keplerian Oscillations under the Influence of the Coriolis Force. *Vladimir Osherovich & Lev Titarchuk.* 523, L73 (1999)

OSONE, S. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

OSTRIKER, JEREMIAH P. The Physical Origin of Scale-dependent Bias in Cosmological Simulations. *Michael Blanton, Renyue Cen, Jeremiah P. Ostriker, & Michael A. Strauss.* 522, 590 (1999)

Effects of Tidal Shocks on the Evolution of Globular Clusters. *Oleg Y. Gnedin, Hyung Mok Lee, & Jeremiah P. Ostriker.* 522, 935 (1999)

OTT, THOMAS. Variable and Embedded Stars in the Galactic Center. *Thomas Ott, Andreas Eckart, & Reinhard Genzel.* 523, 248 (1999)

OUGHTON, S. Coronal Heating by Magnetohydrodynamic Turbulence Driven by Reflected Low-Frequency Waves. *W. H. Matthaeus, G. P. Zank, S. Oughton, D. J. Mullan, & P. Dmitruk.* 523, L93 (1999)

OUYED, RACHID. Skyrmion Stars. *Rachid Ouyed & Malcolm Butler.* 522, 453 (1999)

OWENS, A. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

OZAWA, H. Detection of Hard X-Rays from a Class I Protostar in the HH 24-26 Region in the Orion Molecular Cloud. *H. Ozawa, F. Nagase, Y. Ueda, T. Dotani, & M. Ishida.* 523, L81 (1999)

OZEKI, HIROYUKI. See MAEZAWA, HIROYUKI, et al. Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud.

OZERNOY, L. M. Post-Newtonian Theory for Precision Doppler Measurements of Binary Star Orbits. *S. M. Kopeikin & L. M. Ozernoy.* 523, 771 (1999)

PACHECO, R. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

PACIESAS, WILLIAM S. See MITROFANOV, IGOR G., et al. The Emission Time of Gamma-Ray Bursts.

Average Cosmological Invariant Parameters of Cosmic Gamma-Ray Bursts. *Igor G. Mitrofanov, Dmitrij S. Anfimov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 192 (1999)

Average Emissivity Curve of BATSE Gamma-Ray Bursts with Different Intensities. *Igor G. Mitrofanov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 610 (1999)

PAGE, L. A. See MILLER, A. D., et al. A Measurement of the Angular Power Spectrum of the Cosmic Microwave Background from $l = 100$ to 400.

PALAZZI, E. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

See WIJERS, R. A. M. J., et al. Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope.

PALMER, D. M. Transient Gamma-Ray Observations of Gamma-Ray Lines from Novae. I. Limits on the Positron Annihilation Line in Five Individual Novae. *M. J. Harris, J. E. Naya, B. J. Teegarden, T. L. Cline, N. Gehrels, D. M. Palmer, R. Ramaty, & H. Seifert.* 522, 424 (1999)

PALTRINIERI, B. See ROOD, R. T., et al. The Luminosity Function of M3.

PALTRINIERI, BARBARA. Blue Straggler Stars: The Spectacular Population in M80. *Francesco R. Ferraro, Barbara Paltrinieri, Robert T. Rood, & Ben Dorman.* 522, 983 (1999)

ROSAT HRI X-Ray Observations of the Open Globular Cluster NGC 288. *Craig L. Sarazin, Jimmy A. Irwin, Robert T. Rood, Francesco R. Ferraro, & Barbara Paltrinieri.* 524, 220 (1999)

PALUMBO, P. Activation of the 3.4 Micron Band in Carbon Grains by Exposure to Atomic Hydrogen. *V. Mennella, J. R. Brucato, L. Colangeli, & P. Palumbo.* 524, L71 (1999)

PANAGIA, N. Cepheid Calibration of the Peak Brightness of Type Ia Supernovae. IX. SN 1989B in NGC 3627. *A. Saha, Allan Sandage, G. A. Tammann, Lukas Labhardt, F. D. Macchetto, & N. Panagia.* 522, 802 (1999)

Evolution of the Light Echo of SN 1991T. *W. B. Sparks, F. Macchetto, N. Panagia, F. R. Boffi, D. Branch, M. L. Hazen, & M. Della Valle.* 523, 585 (1999)

PANAITESCU, A. Power Density Spectra of Gamma-Ray Bursts in the Internal Shock Model. *A. Panaitescu, M. Spada, & P. Mészáros.* 522, L105 (1999)

PANZERA, MARIA ROSA. The Brera Multiscale Wavelet *ROSAT* HRI Source Catalog. I. The Algorithm. *Davide Lazzati, Sergio Campana, Piero Rosati, Maria Rosa Panzera, & Gianpiero Tagliaferri.* 524, 414 (1999)

The Brera Multiscale Wavelet *ROSAT* HRI Source Catalog. II. Application to the HRI and First Results. *Sergio Campana, Davide Lazzati, Maria Rosa Panzera, & Gianpiero Tagliaferri.* 524, 423 (1999)

PAREDES, G. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

PARK, H.-S. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

PARMAR, A. N. See SANTANGELO, A., et al. A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features.

PATSOURAKOS, S. Transition-Region Network Boundaries in the Quiet Sun: Width Variation with Temperature as Observed with CDS on *SOHO*. *S. Patsourakos, J.-C. Vial, A. H. Gabriel, & N. Bellamine.* 522, 540 (1999)

PATT, BRIAN L. A Search for Pulse-to-Pulse Variability of the Crab Pulsar. *Brian L. Patt, M. P. Ulmer, William Zhang, James M. Cordes, & Z. Arzoumanian.* 522, 440 (1999)

PATTEN, BRIAN M. The Lithium-Depletion Boundary and the Age of the Young Open Cluster IC 2391. *David Barrado y Navascués, John R. Stauffer, & Brian M. Patten.* 522, L53 (1999)

PAWL, ANDREW. Modeling W44 as a Supernova Remnant in a Density Gradient with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. I. The Analytical Model. *Donald P. Cox, R. L. Shelton, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka.* 524, 179 (1999)

Modeling W44 as a Supernova Remnant in a Density Gradient, with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. II. The Hydrodynamic Models. *R. L. Shelton, Donald P. Cox, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka.* 524, 192 (1999)

PEALE, S. J. Newly Discovered Brown Dwarfs Not Seen in Microlensing Timescale Frequency Distribution? *S. J. Peale.* 524, L67 (1999)

PEDERSEN, H. See HURLEY, K., et al. A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes.

PEDLAR, A. Neutral Hydrogen (21 Centimeter) Absorption in Seyfert Galaxies: Evidence for Free-Free Absorption and Subkiloparsec Gaseous Disks. *J. F. Gallimore, S. A. Baum, C. P. O'Dea, A. Pedlar, & E. Brinks.* 524, 684 (1999)

PEEBLES, P. J. E. A Galaxy X-Ray Fundamental Plane? *M. Fukugita & P. J. E. Peebles.* 524, L31 (1999)

PEI, YICHUAN C. Cosmic Histories of Stars, Gas, Heavy Elements, and Dust in Galaxies. *Yichuan C. Pei, S. Michael Fall, & Michael G. Hauser.* 522, 604 (1999)

PEL, J.-W. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

PENDLETON, GEOFFREY N. See MITROFANOV, IGOR G., et al. The Emission Time of Gamma-Ray Bursts.

Average Cosmological Invariant Parameters of Cosmic Gamma-Ray Bursts. *Igor G. Mitrofanov, Dmitrij S. Anfimov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 192 (1999)

Average Emissivity Curve of BATSE Gamma-Ray Bursts with Different Intensities. *Igor G. Mitrofanov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 610 (1999)

PENG, C. Y. See FALCO, E. E., et al. Dust and Extinction Curves in Galaxies with $z > 0$: The Interstellar Medium of Gravitational Lens Galaxies.

PENG, C. Y. The Quasar Pair Q1634+267A,B and the Binary QSO versus Dark Lens Hypotheses. *C. Y. Peng, C. D. Impey, E. E. Falco, C. S. Kochanek, J. Lehár, B. A. McLeod, H.-W. Rix, C. R. Keeton, & J. A. Muñoz.* 524, 572 (1999)

PÉREZ-MERCADER, JUAN. The Fractal Distribution of Galaxies and the Transition to Homogeneity. *José Gaite, Alvaro Domínguez, & Juan Pérez-Mercader.* 522, L5 (1999)

PERINOTTO, MARIO. Jets, Knots, and Tails in Planetary Nebulae: NGC 3918, K1-2, and Wray 17-1. *Romano L. M. Corradi, Mario Perinotto, Eva Villaver, Antonio Mampaso, & Denise R. Gonçalves.* 523, 721 (1999)

PERLMAN, ERIC S. X-Ray Spectral Variability of PKS 2005−489 during the Spectacular 1998 November Flare. *Eric S. Perlman, Greg Madejski, John T. Stocke, & Travis A. Rector.* 523, L11 (1999)

PETER, H. The Chromosphere in Coronal Holes and the Quiet-Sun Network: An He I (584 Å) Full-Disk Scan by SUMER/*SOHO*. *H. Peter.* 522, L77 (1999)

On the Doppler Shifts of Solar Ultraviolet Emission Lines. *H. Peter & P. G. Judge.* 522, 1148 (1999)

PETERSON, B. A. See RHIE, S. H., et al. Observations of the Binary Microlens Event MACHO 98-SMC-1 by the Microlensing Planet Search Collaboration.

PETRE, R. Recurrent X-Ray Emission Variations of η Carinae and the Binary Hypothesis. *K. Ishibashi, M. F. Corcoran, K. Davidson, J. H. Swank, R. Petre, S. A. Drake, A. Damineli, & S. White.* 524, 983 (1999)

PETRY, C. E. A Study of Lyα Quasar Absorbers in the Nearby Universe. *C. D. Impey, C. E. Petry, & K. P. Flint.* 524, 536 (1999)

PETTINI, MAX. Closing In on Ω_M: The Amplitude of Mass Fluctuations from Galaxy Clusters and the Lyα Forest. *David H. Weinberg, Rupert A. C. Croft, Lars Hernquist, Neal Katz, & Max Pettini.* 522, 563 (1999)

PHELPS, RANDY. A Cepheid Distance to NGC 4603 in Centaurus. *Jeffrey A. Newman, Stephen E. Zepf, Marc Davis, Wendy L. Freedman, Barry F. Madore, Peter B. Stetson, N. Silbermann, & Randy Phelps.* 523, 506 (1999)

PHELPS, RANDY L. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

PHELPS, S. See THOMPSON, D., et al. The Surface Density of Extremely Red Objects.

PHILLIPS, K. J. H. The Radial and Angular Variation of the Electron Density in the Solar Corona. *P. T. Gallagher, M. Mathioudakis, F. P. Keenan, K. J. H. Phillips, & K. Tsinganos.* 524, L133 (1999)

PIAN, E. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

See WIJERS, R. A. M. J., et al. Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope.

PIER, JEFFREY R. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

PIETSCH, WOLFGANG. An Ultradeep High-Resolution X-Ray Image of M101: The X-Ray Source Population in a Late-Type Spiral. *Q. Daniel Wang, Stefan Immler, & Wolfgang Pietsch.* 523, 121 (1999)

PIKE, C. D. Variation of Thermal Structure with Height of a Solar Active Region Derived from *SOHO* CDS and *Yohkoh* BCS Observations. *Alphonse C. Sterling, C. D. Pike, Helen E. Mason, Tetsuya Watanabe, & Spiro K. Antiochos.* 524, 1096 (1999)

PINSONNEAULT, MARC H. Constraining the Cosmic Abundance of Stellar Remnants with Multi-TeV Gamma Rays. *David S. Graff, Katherine Freese, Terry P. Walker, & Marc H. Pinsonneault.* 523, L77 (1999)

PIPHER, JUDITH L. Fe II Bubbles in the Young Planetary Nebula Hubble 12. *Charles A. Welch, A. Frank, Judith L. Pipher, W. J. Forrest, & Charles E. Woodward.* 522, L69 (1999)

PIRAINO, SANTINA. Discovery of a Hard X-Ray Source, SAX J0635+0533, in the Error Box of the Gamma-Ray Source 2EG 0635+0521. *Philip Kaaret, Santina Piraino, Jules Halpern, & Michael Eracleous.* 523, 197 (1999)

PIRO, L. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

See WIJERS, R. A. M. J., et al. Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope.

PIRRONELLO, V. Molecular Hydrogen on Astrophysically Relevant Surfaces. *N. Katz, I. Furman, O. Biham, V. Pirronello, & G. Vidali.* 522, 305 (1999)

PIZZELLA, A. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

PLAIT, PHILIP. *Hubble Space Telescope* Space Telescope Imaging Spectrograph Coronagraphic Imaging of the Herbig AE Star AB Aurigae. *C. A. Grady, B. Woodgate, F. C. Bruhweiler, A. Boggess, Philip Plait, Don J. Lindler, M. Clampin, & P. Kalas.* 523, L151 (1999)

PLANET COLLABORATION, THE. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

PLATAIS, IMANTS. A Large Local Rotational Speed for the Galaxy Found from Proper Motions: Implications for the Mass of the Milky Way. *René A. Méndez, Imants Platais, Terrence M. Girard, Vera Kozhurina-Platais, & William F. van Altena.* 524, L39 (1999)

PLEWA, TOMASZ. Modeling W44 as a Supernova Remnant in a Density Gradient with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. I. The Analytical Model. *Donald P. Cox, R. L. Shelton, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka.* 524, 179 (1999)

Modeling W44 as a Supernova Remnant in a Density Gradient, with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. II. The Hydrodynamic Models. *R. L. Shelton, Donald P. Cox, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka.* 524, 192 (1999)

POGGE, R. W. See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

POLLARD, K. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

POLLARD, K. R. See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

POLOMSKI, ELISHA F. Stellar Masses, Kinematics, and White Dwarf Composition for Three Close DA+dMe Binaries. *Stéphane Vennes, John R. Thorstensen, & Elisha F. Polomski.* 523, 386 (1999)

PONS-BORDERÍA, MARÍA-JESÚS. Comparing Estimators of the Galaxy Correlation Function. *María-Jesús Pons-Bordería, Vicent J. Martínez, Dietrich Stoyan, Helga Stoyan, & Enn Saar.* 523, 480 (1999)

PORRATA, R. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

PORTER, JASON. Observation and Modeling of the Solar Transition Region. I. Multi-Spectral Solar Telescope Array Observations. *Hakeem M. Oluseyi, A. B. C. Walker II, Jason Porter, Richard B. Hoover, & Troy W. Barbee, Jr.* 524, 1105 (1999)

PRADA, FRANCISCO. Where Are the Missing Galactic Satellites? *Anatoly Klypin, Andrey V. Kravtsov, Octavio Valenzuela, & Francisco Prada.* 522, 82 (1999)

PRANTZOS, NIKOS. Explosive Hydrogen Burning of ^{27}Si, ^{31}S, ^{35}Ar, and ^{39}Ca in Novae and X-Ray Bursts. *Christian Iliadis, Pieter M. Endt, Nikos Prantzos, & William J. Thompson.* 524, 434 (1999)

PREECE, R. D. See BRIGGS, M. S., et al. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*.

Evidence for an Early High-Energy Afterglow Observed with BATSE from GRB 980923. *T. W. Giblin, J. van Paradijs, C. Kouveliotou, V. Connaughton, R. A. M. J. Wijers, M. S. Briggs, R. D. Preece, & G. J. Fishman.* 524, L47 (1999)

PREECE, ROBERT D. See MITROFANOV, IGOR G., et al. The Emission Time of Gamma-Ray Bursts.

Average Cosmological Invariant Parameters of Cosmic Gamma-Ray Bursts. *Igor G. Mitrofanov, Dmitrij S. Anfimov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 192 (1999)

Average Emissivity Curve of BATSE Gamma-Ray Bursts with Different Intensities. *Igor G. Mitrofanov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 610 (1999)

PRICE, R. M. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

PRIETO, MERCEDES. The Influence of Bulge Profile Shapes on Claims for a Scale-free Hubble Sequence for Spiral Galaxies. *Alister W. Graham & Mercedes Prieto.* 524, L23 (1999)

PRIMACK, J. R. See KOLATT, T. S., et al. Young Galaxies: What Turns Them On?

PROTHEROE, R. J. TeV Cerenkov Events as Bose-Einstein Gamma Condensations. *Martin Harwit, R. J. Protheroe, & P. L. Biermann.* 524, L91 (1999)

PRUGNA, F. DELLA. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

PRUSTI, T. See GERAKINES, P. A., et al. Observations of Solid Carbon Dioxide in Molecular Clouds with the *Infrared Space Observatory*.

PUCHALLA, J. See MILLER, A. D., et al. A Measurement of the Angular Power Spectrum of the Cosmic Microwave Background from $l = 100$ to 400.

PUTMAN, M. E. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

PYCH, W. *BVRI* Observations of the Optical Afterglow of GRB 990510. *K. Z. Stanek, P. M. Garnavich, J. Kaluzny, W. Pych, & I. Thompson.* 522, L39 (1999)

QIAN, Y.-Z. Probing *r*-Process Production of Nuclei beyond ^{209}Bi with Gamma Rays. *Y.-Z. Qian, P. Vogel, & G. J. Wasserburg.* 524, 213 (1999)

QIAO, G. J. PSR 0943+10: A Bare Strange Star? *R. X. Xu, G. J. Qiao, & Bing Zhang.* 522, L109 (1999)

QUILLEN, A. C. M84: A Warp Caused by Jet-induced Pressure Gradients? *A. C. Quillen & Gary A. Bower.* 522, 718 (1999)

QUINN, J. See RHIE, S. H., et al. Observations of the Binary Microlens Event MACHO 98-SMC-1 by the Microlensing Planet Search Collaboration.

QUINN, THOMAS. Dark Matter Substructure within Galactic Halos. *Ben Moore, Sebastiano Ghigna, Fabio Governato, George Lake, Thomas Quinn, Joachim Stadel, & Paolo Tozzi.* 524, L19 (1999)

RAMATY, R. Transient Gamma-Ray Observations of Gamma-Ray Lines from Novae. I. Limits on the Positron Annihilation Line in Five Individual Novae. *M. J. Harris, J. E. Naya, B. J. Teegarden, T. L. Cline, N. Gehrels, D. M. Palmer, R. Ramaty, & H. Seifert.* 522, 424 (1999)

RAMMACHER, W. Two-Component Theoretical Chromosphere Models for K Dwarfs of Different Magnetic Activity: Exploring the Ca II Emission–Stellar Rotation Relationship. *M. Cuntz, W. Rammacher, P. Ulmschneider, Z. E. Musielak, & S. H. Saar.* 522, 1053 (1999)

RAND, RICHARD J. Diffuse Ionized Gas in Edge-on Spiral Galaxies: Extraplanar and Outer Disk Hα Emission. *Charles G. Hoopes, René A. M. Walterbos, & Richard J. Rand.* 522, 669 (1999)

RANGARAJAN, K. E. Molecular Line Polarization in the Solar Atmosphere: MgH Lines. *D. Mohan Rao & K. E. Rangarajan.* 524, L139 (1999)

RANKIN, JOANNA M. Pulsar Magnetospheric Emission Mapping: Images and Implications of Polar Cap Weather. *Avinash A. Deshpande & Joanna M. Rankin.* 524, 1008 (1999)

RAO, D. MOHAN. Molecular Line Polarization in the Solar Atmosphere: MgH Lines. *D. Mohan Rao & K. E. Rangarajan.* 524, L139 (1999)

RAOULT, A. Radio and X-Ray Imaging Observations of a Continuum Burst. *M. R. Kundu, J. P. Raulin, N. Nitta, & A. Raoult.* 522, 1100 (1999)

RAPOSO, A. P. Eulerian Perturbative Approximations in Planar Symmetry. *A. P. Raposo, L. J. Goicoechea, & J. Buitrago.* 523, 16 (1999)

RASMUSSEN, M. S. Measurement of the Absolute Photoionization Cross Section of C^+ near Threshold. *H. Kjeldsen, F. Folkmann, J. E. Hansen, H. Knudsen, M. S. Rasmussen, J. B. West, & T. Andersen.* 524, L143 (1999)

RAST, MARK PETER. The Thermal Starting Plume as an Acoustic Source. *Mark Peter Rast.* 524, 462 (1999)

RASTÄTTER, LUTZ. Magnetized Accreting Stars: Studies of the Inner Accretion-Disk Edge by a Magnetohydrodynamic Approach. II. Ideal Instabilities of the Inner Disk Edge. *Lutz Rastätter & Karl Schindler.* 524, 361 (1999)

RAULIN, J. P. Radio and X-Ray Imaging Observations of a Continuum Burst. *M. R. Kundu, J. P. Raulin, N. Nitta, & A. Raoult.* 522, 1100 (1999)

RAULIN, J.-P. Multiple Components in the Millimeter Emission of a Solar Flare. *J.-P. Raulin, S. M. White, M. R. Kundu, A. V. R. Silva, & K. Shibasaki.* 522, 547 (1999)

READHEAD, A. C. S. See KULKARNI, S. R., et al. Discovery of a Radio Flare from GRB 990123.

The Proper Motion of Sagittarius A*. I. First VLBA Results. *M. J. Reid, A. C. S. Readhead, R. C. Vermeulen, & R. N. Treuhaft.* 524, 816 (1999)

REBOLO, R. An L-Type Substellar Object in Orion: Reaching the Mass Boundary between Brown Dwarfs and Giant Planets. *M. R. Zapatero Osorio, V. J. S. Béjar, R. Rebolo, E. L. Martín, & G. Basri.* 524, L115 (1999)

REBULL, L. M. Lithium Isotope Ratios in Halo Stars. III. *L. M. Hobbs, J. A. Thorburn, & L. M. Rebull.* 523, 797 (1999)

RECHENMACHER, RON. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

RECTOR, TRAVIS A. X-Ray Spectral Variability of PKS 2005−489 during the Spectacular 1998 November Flare. *Eric S. Perlman, Greg Madejski, John T. Stocke, & Travis A. Rector.* 523, L11 (1999)

REDDY, BACHAM E. An Abundance Analysis of Two Carbon-rich Proto–Planetary Nebulae: IRAS Z02229+6208 and IRAS 07430+1115. *Bacham E. Reddy, Eric J. Bakker, & Bruce J. Hrivnak.* 524, 831 (1999)

REID, I. NEILL. See BURGASSER, ADAM J., et al. Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey.

A Very Low Luminosity, Very Cool, DC White Dwarf. *Hugh C. Harris, Conard C. Dahn, Frederick J. Vrba, Arne A. Henden, James Liebert, Gary D. Schmidt, & I. Neill Reid.* 524, 1000 (1999)

REID, M. J. The Proper Motion of Sagittarius A*. I. First VLBA Results. *M. J. Reid, A. C. S. Readhead, R. C. Vermeulen, & R. N. Treuhaft.* 524, 816 (1999)

REMILLARD, RONALD A. *RXTE* Observations of 0.1–300 Hz Quasi-periodic Oscillations in the Microquasar GRO J1655−40. *Ronald A. Remillard, Edward H. Morgan, Jeffrey E. McClintock, Charles D. Bailyn, & Jerome A. Orosz.* 522, 397 (1999)

RENGARAJAN, T. N. Far-Infrared Observations of the Galactic Star-forming Regions Associated with IRAS 00339+6312 and RAFGL 5111. *B. Mookerjea, S. K. Ghosh, A. D. Karnik, T. N. Rengarajan, S. N. Tandon, & R. P. Verma.* 522, 285 (1999)

RENGEL, M. See SCHAEFER, BRADLSY E., et al. Discovery of the Optical Transient of GRB 990308.

RENGSTORF, A. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

REYES-RUIZ, M. Accretion Disks in Pre–Planetary Nebulae. *M. Reyes-Ruiz & J. A. López.* 524, 952 (1999)

REYNOLDS, R. J. WHAM Observations of Hα, [S II], and [N II] toward the Orion and Perseus Arms: Probing the Physical Conditions of the Warm Ionized Medium. *L. M. Haffner, R. J. Reynolds, & S. L. Tufte.* 523, 223 (1999)

RHIE, S. H. Observations of the Binary Microlens Event MACHO 98-SMC-1 by the Microlensing Planet Search Collaboration. *S. H. Rhie, A. C. Becker, D. P. Bennett, P. C. Fragile, B. R. Johnson, L. J. King, B. A. Peterson, J. Quinn, & (The Microlensing Planet Search Collaboration.* 522, 1037 (1999)

RICHER, HARVEY B. Faint, Moving Objects in the Hubble Deep Field: Components of the Dark Halo? *Rodrigo A. Ibata, Harvey B. Richer, Ronald L. Gilliland, & Douglas Scott.* 524, L95 (1999)

RISALITI, G. The Distribution of Absorbing Column Densities among Seyfert 2 Galaxies. *G. Risaliti, R. Maiolino, & M. Salvati.* 522, 157 (1999)

RIX, H.-W. See FALCO, E. E., et al. Dust and Extinction Curves in Galaxies with $z > 0$: The Interstellar Medium of Gravitational Lens Galaxies.

See PENG, C. Y., et al. The Quasar Pair Q1634+267A,B and the Binary QSO versus Dark Lens Hypotheses.

ROALD, C. B. Chromospheric Magnetic Reconnection and Its Implication for Coronal Heating. *P. A. Sturrock, C. B. Roald, & R. Wolfson.* 524, L75 (1999)

ROBINSON, C. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

ROBINSON, E. L. The Quiescent Accretion Disk in IP Pegasi at Near-Infrared Wavelengths. *C. S. Froning, E. L. Robinson, William F. Welsh, & Janet H. Wood.* 523, 399 (1999)

ROBINSON, RICHARD. Toward an Orbit for the High-Luminosity Cepheid T Monocerotis. *Nancy Remage Evans, Kenneth Carpenter, Richard Robinson, Derck Massa, Glenn M. Wahlgren, Jozsef Vinko, & Laszlo Szabados.* 524, 379 (1999)

ROBY, SCOTT W. Abundances of the Elements in Sharp-lined Early-Type Stars from *IUE* High-Dispersion Spectrograms. II. The Nitrogen Deficiency in Mercury-Manganese Stars. *Scott W. Roby, David S. Leckrone, & Saul J. Adelman.* 524, 974 (1999)

ROCHE, PAUL. Spectroscopic Monitoring of the Be/X-Ray Pulsar X Persei/4U 0352+309 with the *ORFEUS*-SPAS II and the *IUE*. *Myron A. Smith & Paul Roche.* 522, 444 (1999)

RÖSER, H.-J. See THOMPSON, D., et al. The Surface Density of Extremely Red Objects.

ROL, E. See WIJERS, R. A. M. J., et al. Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope.

ROMERO, L. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

ROOD, R. T. The Luminosity Function of M3. *R. T. Rood, E. Carretta, B. Paltrinieri, F. R. Ferraro, F. Fusi-Pecci, B. Dorman, A. Chieffi, O. Straniero, & R. Buonanno.* 523, 752 (1999)

ROOD, ROBERT T. The ^{3}He Abundance in the Planetary Nebula NGC 3242. *Dana S. Balser, Robert T. Rood, & T. M. Bania.* 522, L73 (1999)

Blue Straggler Stars: The Spectacular Population in M80. *Francesco R. Ferraro, Barbara Paltrinieri, Robert T. Rood, & Ben Dorman.* 522, 983 (1999)

ROSAT HRI X-Ray Observations of the Open Globular Cluster NGC 288. *Craig L. Sarazin, Jimmy A. Irwin, Robert T. Rood, Francesco R. Ferraro, & Barbara Paltrinieri.* 524, 220 (1999)

ROSATI, PIERO. The Brera Multiscale Wavelet *ROSAT* HRI Source Catalog. I. The Algorithm. *Davide Lazzati, Sergio Campana, Piero Rosati, Maria Rosa Panzera, & Gianpiero Tagliaferri.* 524, 414 (1999)

ROSCHERR, B. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

ROSEN, ALEXANDER. On the Dynamics and Structure of Three-dimensional Trans-Alfvénic Jets. *Philip E. Hardee & Alexander Rosen.* 524, 650 (1999)

ROSENZWEIG, P. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

ROSOLOWSKY, ERIK W. The Spectral Correlation Function: A New Tool for Analyzing Spectral Line Maps. *Erik W. Rosolowsky, Alyssa A. Goodman, David J. Wilner, & Jonathan P. Williams.* 524, 887 (1999)

RÓZYCZKA, M. Driving Outflows from Young Stars through the Effects of Internal Disk Fields. *N. J. Turner, P. Bodenheimer, & M. Różyczka.* 524, 129 (1999)

RÓZYCZKA, MICHAŁ. Modeling W44 as a Supernova Remnant in a Density Gradient with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. I. The Analytical Model. *Donald P. Cox, R. L. Shelton, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka.* 524, 179 (1999)

Modeling W44 as a Supernova Remnant in a Density Gradient, with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. II. The Hydrodynamic Models. *R. L. Shelton, Donald P. Cox, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka.* 524, 192 (1999)

RUDOLPH, ALEXANDER L. The HCO^+ Molecular Outflow in NGC 2071. *José M. Girart, Paul T. P. Ho, Alexander L. Rudolph, Robert Estalella, David J. Wilner, & Lawrence M. Chernin.* 522, 921 (1999)

RUETSCH, G. R. Small-Scale Interaction of Turbulence with Thermonuclear Flames in Type Ia Supernovae. *J. C. Niemeyer, W. K. Bushe, & G. R. Ruetsch.* 524, 290 (1999)

RUFFLE, DEBORAH P. The Abundance of C_7^- in Diffuse Clouds. *Deborah P. Ruffle, R. P. A. Bettens, Radoslava Terzieva, & Eric Herbst.* 523, 678 (1999)

RYAN, J. M. See BRIGGS, M. S., et al. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*.

RYAN, SEAN G. The Spite Lithium Plateau: Ultrathin but Postprimordial. *Sean G. Ryan, John E. Norris, & Timothy C. Beers.* 523, 654 (1999)

RYBICKI, GEORGE B. Scattered Lyα Radiation around Sources before Cosmological Reionization. *Abraham Loeb & George B. Rybicki.* 524, 527 (1999)

RYDER, S. D. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

SAAR, ENN. Comparing Estimators of the Galaxy Correlation Function. *María-Jesús Pons-Bordería, Vicent J. Martínez, Dietrich Stoyan, Helga Stoyan, & Enn Saar.* 523, 480 (1999)

SAAR, S. H. Two-Component Theoretical Chromosphere Models for K Dwarfs of Different Magnetic Activity: Exploring the Ca II Emission–Stellar Rotation Relationship. *M. Cuntz, W. Rammacher, F. Ulmschneider, Z. E. Musielak, & S. H. Saar.* 522, 1053 (1999)

SAAR, STEVEN H. Time Evolution of the Magnetic Activity Cycle Period. II. Results for an Expanded Stellar Sample. *Steven H. Saar & Axel Brandenburg.* 524, 295 (1999)

SABA, J. L. R. Emission Measure Distribution for an Active Region Using Coordinated SERTS and *Yohkoh* SXT Observations. *J. T. Schmelz, J. L. R. Saba, K. T. Strong, H. D. Winter, & J. W. Brosius.* 523, 432 (1999)

SABBEY, C. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

SACKETT, P. D. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

SADAVA, D. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

SADLER, E. M. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

SAEVICH, YURIJ YU. See MITROFANOV, IGOR G., et al. The Emission Time of Gamma-Ray Bursts.

SÁFÁR, J. De-Excitation of ^{180}mTa by ^{60}Co Gamma Rays. *I. Bikit, L. Lakosi, J. Sáfár, & Lj. Čonkić.* 522, 419 (1999)

SAFIZADEH, NEDA. Astrometric Microlensing as a Method of Discovering and Characterizing Extrasolar Planets. *Neda Safizadeh, Neal Dalal, & Kim Griest.* 522, 512 (1999)

SAHA, A. Cepheid Calibration of the Peak Brightness of Type Ia Supernovae. IX. SN 1989B in NGC 3627. *A. Saha, Allan Sandage, G. A. Tammann, Lukas Labhardt, F. D. Macchetto, & N. Panagia.* 522, 802 (1999)

SAHA, ABHIJIT. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

SAHAI, RAGHVENDRA. Discovery of a Remarkable Point-Symmetric Proto–Planetary Nebula: *Hubble Space Telescope* Imaging of IRAS 04296+3429. *Raghvendra Sahai.* 524, L125 (1999)

SAHU, K. C. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

SAHU, M. S. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

The D/H Ratio in Interstellar Gas toward G191−B2B. *M. S. Sahu, W. Landsman, F. C. Bruhweiler, T. R. Gull, C. A. Bowers, D. Lindler, K. Feggans, M. A. Barstow, I. Hubeny, & J. B. Holberg.* 523, L159 (1999)

SAITO, GAKU. See MAEZAWA, HIROYUKI, et al. Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud.

SAITO, SHUJI. See MAEZAWA, HIROYUKI, et al. Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud.

SAITO, YOSHITAKA. Spin-down of the 65 Millisecond X-Ray Pulsar in the Supernova Remnant G11.2−0.3. *Ken'ichi Torii, Hiroshi Tsunemi, Tadayasu Dotani, Kazuhisa Mitsuda, Nobuyuki Kawai, Kenzo Kinugasa, Yoshitaka Saito, & Shinpei Shibata.* 523, L69 (1999)

SAKAI, SHOKO. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319. *Shoko Sakai, Laura Ferrarese, Robert C. Kennicutt, John A. Graham, N. A. Silbermann, Jeremy R. Mould, Wendy L. Freedman, Fabio Bresolin, Holland C. Ford, Brad K. Gibson, Mingsheng Han, Paul Harding, John G. Hoessel, John P. Huchra, Shaun M. Hughes, Garth D. Illingworth, Daniel Kelson, Lucas Macri, Barry F. Madore, Randy L. Phelps, Abhijit Saha, Kim M. Sebo, Peter B. Stetson, & Anne Turner.* 523, 540 (1999)

SAKAKI, N. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

SAKAMOTO, SEIICHI. Mass and Physical Conditions of Molecular Gas at Cosmological Distances Probed with CO Lines. *Seiichi Sakamoto.* 523, 701 (1999)

SALIM, SAMIR. Sagittarius A* "Visual Binaries": A Direct Measurement of the Galactocentric Distance. *Samir Salim & Andrew Gould.* 523, 633 (1999)

Photometric Microlens Parallaxes with the *Space Interferometry Mission*. *Andrew Gould & Samir Salim.* 524, 794 (1999)

SALVATI, M. The Distribution of Absorbing Column Densities among Seyfert 2 Galaxies. *G. Risaliti, R. Maiolino, & M. Salvati.* 522, 157 (1999)

SALZER, JOHN J. See FREUDLING, WOLFRAM, et al. Large-Scale Power Spectrum and Cosmological Parameters from SFI Peculiar Velocities.

SÁNCHEZ, GE. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

SÁNCHEZ, GU. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

SÁNCHEZ-SALCEDO, F. J. Deceleration by Dynamical Friction in a Gaseous Medium. *F. J. Sánchez-Salcedo & A. Brandenberg.* 522, L35 (1999)

SANDAGE, ALLAN. On the Sensitivity of the Cepheid Period-Luminosity Relation to Variations of Metallicity. *Allan Sandage, R. A. Bell, & Michael J. Tripicco.* 522, 250 (1999)

Cepheid Calibration of the Peak Brightness of Type Ia Supernovae. IX. SN 1989B in NGC 3627. *A. Saha, Allan Sandage, G. A. Tammann, Lukas Labhardt, F. D. Macchetto, & N. Panagia.* 522, 802 (1999)

SANDERS, D. B. Optical Spectroscopy of the *IRAS* 1 Jy Sample of Ultraluminous Infrared Galaxies. *Sylvain Veilleux, D.-C. Kim, & D. B. Sanders.* 522, 113 (1999)

New Results from a Near-Infrared Search for Hidden Broad-Line Regions in Ultraluminous Infrared Galaxies. *Sylvain Veilleux, D. B. Sanders, & D.-C. Kim.* 522, 139 (1999)

^{13}CO J = 1–0 Depression in Luminous Starburst Mergers, Revisited. *Yoshiaki Taniguchi, Youichi Ohyama, & D. B. Sanders.* 522, 214 (1999)

SANDHU, J. S. Parallax of PSR J1744−1134 and the Local Interstellar Medium. *M. Toscano, M. C. Britton, R. N. Manchester, M. Bailes, J. S. Sandhu, S. R. Kulkarni, & S. B. Anderson.* 523, L171 (1999)

SANIN, ANTON B. See MITROFANOV, IGOR G., et al. The Emission Time of Gamma-Ray Bursts.

SANTANGELO, A. A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features. *A. Santangelo, A. Segreto, S. Giarrusso, D. Dal Fiume, M. Orlandini, A. N. Parmar, T. Oosterbroek, T. Bulik, T. Mihara, S. Campana, G. L. Israel, & L. Stella.* 523, L85 (1999)

SARAZIN, CRAIG L. *ROSAT* HRI X-Ray Observations of the Open Globular Cluster NGC 288. *Craig L. Sarazin, Jimmy A. Irwin, Robert T. Rood, Francesco R. Ferraro, & Barbara Paltrinieri.* 524, 220 (1999)

SARCEVIC, INA. High-Energy Emission from Relativistic Particles in Sagittarius A*. *Sera Markoff, Fulvio Melia, & Ina Sarcevic.* 522, 870 (1999)

SARGENT, WALLACE L. W. Galaxy Clustering and Large-Scale Structure from z = 0.2 to z = 0.5 in Two Norris Redshift Surveys. *Todd A. Small, Chung-Pei Ma, Wallace L. W. Sargent, & Donald Hamilton.* 524, 31 (1999)

SARI, R. See KULKARNI, S. R., et al. Discovery of a Radio Flare from GRB 990123.

See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

SARI, RE'EM. Linear Polarization and Proper Motion in the Afterglow of Beamed Gamma-Ray Bursts. *Re'em Sari.* 524, L43 (1999)

SASAKI, M. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

SASSELOV, D. D. A New Calculation of the Recombination Epoch. *S. Seager, D. D. Sasselov, & D. Scott.* 523, L1 (1999)

SAVAGE, BLAIR D. GHRS and *ORFEUS II* Observations of the Highly Ionized Interstellar Medium toward ESO 141−055. *Kenneth R. Sembach, Blair D. Savage, & Mark Hurwitz.* 524, 98 (1999)

SAVIN, D. W. Experimentally Derived Dielectronic Recombination Rate Coefficients for Helium-like C V and Hydrogenic O VIII. *D. W. Savin.* 523, 855 (1999)

SCALO, JOHN. Velocity Field Statistics in Star-forming Regions. I. Centroid Velocity Observations. *Mark S. Miesch, John Scalo, & John Bally.* 524, 895 (1999)

SCARGLE, J. D. Rotational Signature and Possible *r*-Mode Signature in the Gallex Solar Neutrino Data. *P. A. Sturrock, J. D. Scargle, G. Walther, & M. S. Wheatland.* 523, L177 (1999)

SCHAEFER, B. E. See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

SCHAEFER, BRADLEY E. Discovery of the Optical Transient of GRB 990308. *Bradley E. Schaefer, J. A. Snyder, J. Hernandez, B. Roscherr, M. Deng, N. Ellman, C. Bailyn, A. Rengstorf, D. Smith, A. Levine, S. Barthelmy, P. Butterworth, K. Hurley, T. Cline, C. Meegan, C. Kouveliotou, R. M. Kippen, H.-S. Park, G. G. Williams, R. Porrata, R. Bionta, D. Hartmann, D. Band, D. Frail, S. Kulkarni, J. Bloom, S. Djorgovski, D. Sadava, F. Chaffee, F. Harris, C. Abad, B. Adams, P. Andrews, C. Baltay, A. Bongiovanni, C. Briceno, G. Bruzual, P. Coppi, F. Della Prugna, A. Dubuc, W. Emmet, I. Ferrin, F. Fuenmayor, M. Gebhard, D. Herrera, K. Honeycutt, G. Magris, J. Mateu, S. Muffson, J. Musser, O. Naranjo, A. Oemler, R. Pacheco, G. Paredes, M. Rengel, L. Romero, P. Rosenzweig, C. Sabbey, Ge. Sánchez, Gu. Sánchez, H. Schenner, J. Shin, J. Sinnott, S. Sofia, J. Stock, J. Suarez, D. Tellèria, B. Vicente, K. Vieira, & K. Vivas.* 524, L103 (1999)

SCHATZ, HENDRIK. The Rapid Proton Process Ashes from Stable Nuclear Burning on an Accreting Neutron Star. *Hendrik Schatz, Lars Bildsten, Andrew Cumming, & Michael Wiescher.* 524, 1014 (1999)

SCHENNER, H. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

SCHINDLER, KARL. Magnetized Accreting Stars: Studies of the Inner Accretion-Disk Edge by a Magnetohydrodynamic Approach. II. Ideal Instabilities of the Inner Disk Edge. *Lutz Rastätter & Karl Schindler.* 524, 361 (1999)

SCHINNERER, E. The Molecular Gas in the Circumnuclear Region of Seyfert Galaxies. *E. Schinnerer, A. Eckart, & L. J. Tacconi.* 524, L5 (1999)

SCHLEGEL, DAVID J. Extrapolation of Galactic Dust Emission at 100 Microns to Cosmic Microwave Background Radiation Frequencies Using FIRAS. *Douglas P. Finkbeiner, Marc Davis, & David J. Schlegel.* 524, 867 (1999)

SCHMELZ, J. T. Emission Measure Distribution for an Active Region Using Coordinated SERTS and *Yohkoh* SXT Observations. *J. T. Schmelz, J. L. R. Saba, K. T. Strong, H. D. Winter, & J. W. Brosius.* 523, 432 (1999)

SCHMIDT, B. P. See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

SCHMIDT, GARY D. A Very Low Luminosity, Very Cool, DC White Dwarf. *Hugh C. Harris, Conard C. Dahn, Frederick J. Vrba, Arne A. Henden, James Liebert, Gary D. Schmidt, & I. Neill Reid.* 524, 1000 (1999)

SCHMIDT, M. R. The Yellow Hypergiants HR 8752 and ρ Cassiopeiae near the Evolutionary Border of Instability. *G. Israelian, A. Lobel, & M. R. Schmidt.* 523, L145 (1999)

SCHMIDT, MAARTEN. Luminosities and Space Densities of Gamma-Ray Bursts. *Maarten Schmidt.* 523, L117 (1999)

SCHNEIDER, DONALD P. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

SCHOU, J. Migration of Zonal Flows Detected Using Michelson Doppler Imager *f*-Mode Frequency Splittings. *J. Schou.* 523, L181 (1999)

SCHUTTE, W. A. See GERAKINES, P. A., et al. Observations of Solid Carbon Dioxide in Molecular Clouds with the *Infrared Space Observatory*.

SCOTT, D. A New Calculation of the Recombination Epoch. *S. Seager, D. D. Sasselov, & D. Scott.* 523, L1 (1999)

SCOTT, DOUGLAS. Faint, Moving Objects in the Hubble Deep Field: Components of the Dark Halo? *Rodrigo A. Ibata, Harvey B. Richer, Ronald L. Gilliland, & Douglas Scott.* 524, L95 (1999)

SCOVILLE, N. Z. A New High-Resolution CO Map of the Inner 2.5 Arcminutes of M51. I. Streaming Motions and Spiral Structure. *S. Aalto, S. Hüttemeister, N. Z. Scoville, & P. Thaddeus.* 522, 165 (1999)

Gasdynamics in the Luminous Merger NCG 6240. *L. J. Tacconi, R. Genzel, M. Tecza, J. F. Gallimore, D. Downes, & N. Z. Scoville.* 524, 732 (1999)

SEAGER, S. A New Calculation of the Recombination Epoch. *S. Seager, D. D. Sasselov, & D. Scott.* 523, L1 (1999)

SEAHRA, S. S. 2175 Å and 3.4 Micron Absorption Bands and Carbon Depletion in the Diffuse Interstellar Medium. *W. W. Duley & S. S. Seahra.* 522, L129 (1999)

SEBO, KIM M. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

SEDRAKIAN, ARMEN. Precession of Isolated Neutron Stars. I. Effects of Imperfect Pinning. *Armen Sedrakian, Ira Wasserman, & James M. Cordes.* 524, 341 (1999)

SEGRETO, A. See SANTANGELO, A., et al. A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features.

SEIFERT, H. Transient Gamma-Ray Observations of Gamma-Ray Lines from Novae. I. Limits on the Positron Annihilation Line in Five Individual Novae. *M. J. Harris, J. E. Naya, B. J. Teegarden, T. L. Cline, N. Gehrels, D. M. Palmer, R. Ramaty, & H. Seifert.* 522, 424 (1999)

SEKIMOTO, YUTARO. See MAEZAWA, HIROYUKI, et al. Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud.

SELLWOOD, J. A. The Properties of the Galactic Bar Implied by Gas Kinematics in the Inner Milky Way. *Benjamin J. Weiner & J. A. Sellwood.* 524, 112 (1999)

SEMBACH, KENNETH R. Ionized Gas in Damped Lyα Systems and Its Effects on Elemental Abundance Studies. *J. Christopher Howk & Kenneth R. Sembach.* 523, L141 (1999)

GHRS and *ORFEUS II* Observations of the Highly Ionized Interstellar Medium toward ESO 141−055. *Kenneth R. Sembach, Blair D. Savage, & Mark Hurwitz.* 524, 98 (1999)

SETO, NAOKI. Modification of Weakly Nonlinear Mode Couplings Due to the Periodic Boundary Condition. *Naoki Seto.* 523, 24 (1999)

SHARA, MICHAEL M. First Direct Measurement of Acceleration in the Outflow of a Nova: U Scorpii (1999). *Sébastien Lépine, Michael M. Shara, Mario Livio, & David Zurek.* 522, L121 (1999)

SHARE, G. H. See BRIGGS, M. S., et al. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*.

SHELTON, R. L. Modeling W44 as a Supernova Remnant in a Density Gradient with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. I. The Analytical Model. *Donald P. Cox, R. L. Shelton, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka.* 524, 179 (1999)

Modeling W44 as a Supernova Remnant in a Density Gradient, with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. II. The Hydrodynamic Models. *R. L. Shelton, Donald P. Cox, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka.* 524, 192 (1999)

SHEPHERD, D. S. See KULKARNI, S. R., et al. Discovery of a Radio Flare from GRB 990123.

A 1000 AU Rotating Disk around the Massive Young Stellar Object G192.16−3.82. *D. S. Shepherd & S. E. Kurtz.* 523, 690 (1999)

SHEVCHENKO, V. I. Evolution of Nonlinear Alfvén Waves in Streaming Inhomogeneous Plasmas. *B. Buti, V. L. Galinski, V. I. Shevchenko, G. S. Lakhina, B. T. Tsurutani, B. E. Goldstein, P. Diamond, & M. V. Medvedev.* 523, 849 (1999)

SHI, SHENG-CAI. See MAEZAWA, HIROYUKI, et al. Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud.

SHIBASAKI, K. Multiple Components in the Millimeter Emission of a Solar Flare. *J.-P. Raulin, S. M. White, M. R. Kundu, A. V. R. Silva, & K. Shibasaki.* 522, 547 (1999)

SHIBATA, KAZUNARI. Relativistic Jet Formation from Black Hole Magnetized Accretion Disks: Method, Tests, and Applications of a General Relativistic Magnetohydrodynamic Numerical Code. *Shinji Koide, Kazunari Shibata, & Takahiro Kudoh.* 522, 727 (1999)

SHIBATA, R. Temperature Variation in the Cluster of Galaxies Abell 115 Studied with *ASCA*. *R. Shibata, H. Honda, M. Ishida, T. Ohashi, & K. Yamashita.* 524, 603 (1999)

SHIBATA, SHINPEI. Spin-down of the 65 Millisecond X-Ray Pulsar in the Supernova Remnant G11.2−0.3. *Ken'ichi Torii, Hiroshi Tsunemi, Tadayasu Dotani, Kazuhisa Mitsuda, Nobuyuki Kawai, Kenzo Kinugasa, Yoshitaka Saito, & Shinpei Shibata.* 523, L69 (1999)

SHIN, J. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

SHINE, RICHARD. Bright Chromospheric Grains and the Magnetic Intranetwork. *John Worden, John Harvey, & Richard Shine.* 523, 450 (1999)

SHINOZAKI, K. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

SHIREY, ROBERT E. Scattering and Iron Fluorescence Revealed during Absorption Dips in Circinus X-1. *Robert E. Shirey, Alan M. Levine, & Hale V. Bradt.* 524, 1048 (1999)

SHOPBELL, P. L. The Very Extended Ionized Nebula around the Quasar MR 2251−178. *P. L. Shopbell, S. Veilleux, & J. Bland-Hawthorn.* 524, L83 (1999)

SIEBERT, JOACHIM. An *RXTE* Observation of NGC 6300: A New Bright Compton Reflection–dominated Seyfert 2 Galaxy. *Karen M. Leighly, Jules Halpern, Hisamitsu Awaki, Massimo Cappi, Shiro Ueno, & Joachim Siebert.* 522, 209 (1999)

SIGAD, Y. See KOLATT, T. S., et al. Young Galaxies: What Turns Them On?

SILBERMANN, N. A Cepheid Distance to NGC 4603 in Centaurus. *Jeffrey A. Newman, Stephen E. Zepf, Marc Davis, Wendy L. Freedman, Barry F. Madore, Peter B. Stetson, N. Silbermann, & Randy Phelps.* 523, 506 (1999)

SILBERMANN, N. A. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

SILICH, SERGEI. Superbubble Evolution Including the Star-forming Clouds: Is It Possible to Reconcile Large Magellanic Cloud Observations with Model Predictions? *Sergei Silich & José Franco.* 522, 863 (1999)

SILK, JOE. A Semiempirical Model of the Infrared Universe. *Jonathan C. Tan, Joe Silk, & Christophe Balland.* 522, 579 (1999)

SILK, JOSEPH. The Sunyaev-Zeldovich Effect by Cocoons of Radio Galaxies. *Masako Yamada, Naoshi Sugiyama, & Joseph Silk.* 522, 66 (1999)

A Look at Three Different Scenarios for Bulge Formation: Erratum. *Rychard Bouwens, Laura Cayón, & Joseph Silk.* 522, 560 (1999) (Orig. paper in 516, 77 (1999))

SILVA, A. V. R. Multiple Components in the Millimeter Emission of a Solar Flare. *J.-P. Raulin, S. M. White, M. R. Kundu, A. V. R. Silva, & K. Shibasaki.* 522, 547 (1999)

SIMPSON, CHRIS. *Hubble Space Telescope*/Faint Object Spectrograph Spectroscopy of Spatially Resolved Narrow-Line Regions in the Seyfert 2 Galaxies NGC 2110 and NGC 5929. *Pierre Ferruit, Andrew S. Wilson, Mark Whittle, Chris Simpson, John S. Mulchaey, & Gary J. Ferland.* 523, 147 (1999)

SINNOTT, J. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

SITTLER, EDWARD C., JR. Semiempirical Two-dimensional Magnetohydrodynamic Model of the Solar Corona and Interplanetary Medium. *Edward C. Sittler, Jr., & Madhulika Guhathakurta.* 523, 812 (1999)

SKINNER, STEPHEN L. Simultaneous Radio and X-Ray Observations of the Wolf-Rayet Star WR 147. *Stephen L. Skinner, Masayuki Itoh, Fumiaki Nagase, & Svetozar A. Zhekov.* 524, 394 (1999)

SKRUTSKIE, MICHAEL F. See BURGASSER, ADAM J., et al. Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey.

SLINGLEND, KURT A. Projection, Spatial Correlations, and Anisotropies in a Large and Complete Sample of Abell Clusters. *Christopher J. Miller, David J. Batuski, Kurt A. Slinglend, & John M. Hill.* 523, 492 (1999)

SMAIL, I. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

SMALL, TODD A. Galaxy Clustering and Large-Scale Structure from $z = 0.2$ to $z = 0.5$ in Two Norris Redshift Surveys. *Todd A. Small, Chung-Pei Ma, Wallace L. W. Sargent, & Donald Hamilton.* 524, 31 (1999)

SMITH, D. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

SMITH, D. A. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

SMITH, J. ALLYN. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

SMITH, MYRON A. Spectroscopic Monitoring of the Be/X-Ray Pulsar X Persei/4U 0352+309 with the *ORFEUS*-SPAS II and the *IUE*. *Myron A. Smith & Paul Roche.* 522, 444 (1999)

SMITH, RANDALL K. Modeling W44 as a Supernova Remnant in a Density Gradient with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. I. The Analytical Model. *Donald P. Cox, R. L. Shelton, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka.* 524, 179 (1999)

Modeling W44 as a Supernova Remnant in a Density Gradient, with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. II. The Hydrodynamic Models. *R. L. Shelton, Donald P. Cox, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka.* 524, 192 (1999)

SNYDER, J. A. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

SNYDER, LEWIS E. Subarcsecond Resolution Observations of Sagittarius B2 at 85 GHz. *Sheng-Yuan Liu & Lewis E. Snyder.* 523, 683 (1999)

SODA, JIRO. Stochastic Biasing and Galaxy–Mass Density Relation in the Weakly Nonlinear Regime. *Atsushi Taruya & Jiro Soda.* 522, 46 (1999)

SOFFITA, P. See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

SOFFITTA, P. See WIJERS, R. A. M. J., et al. Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope.

SOFIA, S. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

SOFIA, ULYSSES J. The Abundance of Interstellar Tin and Cadmium. *Ulysses J. Sofia, David M. Meyer, & Jason A. Cardelli.* 522, L137 (1999)

SOFUE, Y. Central Rotation Curves of Spiral Galaxies. *Y. Sofue, Y. Tutui, M. Honma, A. Tomita, T. Takamiya, J. Koda, & Y. Takeda.* 523, 136 (1999)

SOLF, J. A Deep Long-Slit Spectroscopic Study of the Two Bipolar Outflows from the T Tauri Binary System. *J. Solf & K.-H. Bohm.* 523, 709 (1999)

SOMERVILLE, R. S. See KOLATT, T. S., et al. Young Galaxies: What Turns Them On?

SOUMA, N. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

SPADA, M. Power Density Spectra of Gamma-Ray Bursts in the Internal Shock Model. *A. Panaitescu, M. Spada, & P. Mészáros.* 522, L105 (1999)

SPANGLER, STEVEN R. Two-dimensional Magnetohydrodynamics and Interstellar Plasma Turbulence. *Steven R. Spangler.* 522, 879 (1999)

SPARKS, W. B. Evolution of the Light Echo of SN 1991T. *W. B. Sparks, F. Macchetto, N. Panagia, F. R. Boffi, D. Branch, M. L. Hazen, & M. Della Valle.* 523, 585 (1999)

SRAMEK, R. A. Proper Motion of the Compact, Nonthermal Radio Source in the Galactic Center, Sagittarius A*. *D. C. Backer & R. A. Sramek.* 524, 805 (1999)

SRIDHAR, S. Constrained Violent Relaxation to a Spherical Halo. *A. Mangalam, R. Nityananda, & S. Sridhar.* 524, 623 (1999)

STADEL, JOACHIM. Dark Matter Substructure within Galactic Halos. *Ben Moore, Sebastiano Ghigna, Fabio Governato, George Lake, Thomas Quinn, Joachim Stadel, & Paolo Tozzi.* 524, L19 (1999)

STANEK, K. Z. *BVRI* Observations of the Optical Afterglow of GRB 990510. *K. Z. Stanek, P. M. Garnavich, J. Kaluzny, W. Pych, & I. Thompson.* 522, L39 (1999)

STAPPERS, B. W. Transient Radio Emission from SAX J1808.4−3658. *B. M. Gaensler, B. W. Stappers, & T. J. Getts.* 522, L117 (1999)

STATLER, THOMAS S. On the Nuclear Rotation Curve of M31. *Thomas S. Statler.* 524, L87 (1999)

STAUFFER, JOHN R. The Lithium-Depletion Boundary and the Age of the Young Open Cluster IC 2391. *David Barrado y Navascués, John R. Stauffer, & Brian M. Patten.* 522, L53 (1999)

STAVELEY-SMITH, L. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

STEIGMAN, G. Ω_B and Ω_0 from MACHOs and Local Group Dynamics. *G. Steigman & I. Tkachev.* 522, 793 (1999)

STEIN, J. The Role of Kinetic Energy Flux in the Convective Urca Process. *J. Stein, Z. Barkat, & J. C. Wheeler.* 523, 381 (1999)

STELLA, L. See SANTANGELO, A., et al. A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features.

STELLA, LUIGI. Correlations in the Quasi-periodic Oscillation Frequencies of Low-Mass X-Ray Binaries and the Relativistic Precession Model. *Luigi Stella, Mario Vietri, & Sharon M. Morsink.* 524, L63 (1999)

STEPANOV, A. V. Second-Harmonic Plasma Radiation of Magnetically Trapped Electrons in Stellar Coronae. *A. V. Stepanov, B. Kliem, A. Krüger, J. Hildebrandt, & V. I. Garaimov.* 524, 961 (1999)

STERLING, ALPHONSE C. Variation of Thermal Structure with Height of a Solar Active Region Derived from *SOHO* CDS and *Yohkoh* BCS Observations.

Alphonse C. Sterling, C. D. Pike, Helen E. Mason, Tetsuya Watanabe, & Spiro K. Antiochos. 524, 1096 (1999)

STETSON, P. B. Hot Horizontal-Branch Stars: The Ubiquitous Nature of the "Jump" in Strömgren *u*, Low Gravities, and the Role of Radiative Levitation of Metals. *F. Grundahl, M. Catelan, W. B. Landsman, P. B. Stetson, & M. I. Andersen.* 524, 242 (1999)

STETSON, PETER B. A Cepheid Distance to NGC 4603 in Centaurus. *Jeffrey A. Newman, Stephen E. Zepf, Marc Davis, Wendy L. Freedman, Barry F. Madore, Peter B. Stetson, N. Silbermann, & Randy Phelps.* 523, 506 (1999)

See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

STEWART, I. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

STIAVELLI, MASSIMO. A NICMOS Search for High-Redshift Elliptical Galaxy Candidates. *Tommaso Treu & Massimo Stiavelli.* 524, L27 (1999)

STOCK, J. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

STOCKE, JOHN T. X-Ray Spectral Variability of PKS 2005−489 during the Spectacular 1998 November Flare. *Eric S. Perlman, Greg Madejski, John T. Stocke, & Travis A. Rector.* 523, L11 (1999)

STOCKTON, ALAN. Reflection of Bulge Light from a 2 Kiloparsec Segment of Dust Lane in the Galaxy NGC 2841. *David L. Block, Alan Stockton, Bruce G. Elmegreen, & Jon Willis.* 522, L25 (1999)

STOEGER, WILLIAM R., S.J. The Limits on Cosmological Anisotropies and Inhomogeneities from *COBE* Data: Erratum. *William R. Stoeger, S.J., Marcelo E. Araujo, & Tim Gebbie.* 522, 559 (1999) (Orig. paper in 476, 435 (1997))

STONE, E. C. See WIEDENBECK, M. E., et al. Constraints on the Time Delay between Nucleosynthesis and Cosmic-Ray Acceleration from Observations of Ni and Co.

STOOTMAN, F. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

STOTHERS, RICHARD B. The Brightest Supergiants Predicted by Theory. *Richard B. Stothers & Chao-wen Chin.* 522, 960 (1999)

STOUGHTON, CHRIS. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

STOYAN, DIETRICH. Comparing Estimators of the Galaxy Correlation Function. *María-Jesús Pons-Bordería, Vicent J. Martínez, Dietrich Stoyan, Helga Stoyan, & Enn Saar.* 523, 480 (1999)

STOYAN, HELGA. Comparing Estimators of the Galaxy Correlation Function. *María-Jesús Pons-Bordería, Vicent J. Martínez, Dietrich Stoyan, Helga Stoyan, & Enn Saar.* 523, 480 (1999)

STRANIERO, O. See ROOD, R. T., et al. The Luminosity Function of M3.

STRANIERO, OSCAR. Intermediate-Mass Stars: Updated Models. *Inma Dominguez, Alessandro Chieffi, Marco Limongi, & Oscar Straniero.* 524, 226 (1999)

STRAUSS, MICHAEL A. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data. *Michael A. Strauss, Xiaohui Fan, James E. Gunn, S. K. Leggett, T. R. Geballe, Jeffrey R. Pier, Robert H. Lupton, G. R. Knapp, James Annis, J. Brinkmann, J. H. Crocker, István Csabai, Masataka Fukugita, David A. Golimowski, Frederick H. Harris, G. S. Henessey, Robert S. Hindsley, Željko Ivezić, Stephen Kent, D. Q. Lamb, Jeffrey A. Munn, Heidi Jo Newberg, Ron Rechenmacher, Donald P. Schneider, J. Allyn Smith, Chris Stoughton, Douglas L. Tucker, Patrick Waddell, & Donald G. York.* 522, L61 (1999)

The Physical Origin of Scale-dependent Bias in Cosmological Simulations. *Michael Blanton, Renyue Cen, Jeremiah P. Ostriker, & Michael A. Strauss.* 522, 590 (1999)

STRICKMAN, M. S. A *Rossi X-Ray Timing Explorer* Observation of the Vela Pulsar: Filling in the X-Ray Gap. *M. S. Strickman, A. K. Harding, & O. C. de Jager.* 524, 373 (1999)

STROHMAYER, TOD. See WOODS, PETER M., et al. Variable Spin-down in the Soft Gamma Repeater SGR 1900+14 and Correlations with Burst Activity.

STROHMAYER, TOD E. Spin-down of Pulsations in the Cooling Tail of an X-Ray Burst from 4U 1636−53. *Tod E. Strohmayer.* 523, L51 (1999)

STRONG, J. P. The [N II] Kinematics of R Aquarii. *J. M. Hollis, S. N. Vogel, D. Van Buren, J. P. Strong, R. G. Lyon, & J. E. Dorband.* 522, 297 (1999)

STRONG, K. T. Emission Measure Distribution for an Active Region Using Coordinated SERTS and *Yohkoh* SXT Observations. *J. T. Schmelz, J. L. R. Saba, K. T. Strong, H. D. Winter, & J. W. Brosius.* 523, 432 (1999)

STURROCK, P. A. Rotational Signature and Possible *r*-Mode Signature in the Gallex Solar Neutrino Data. *P. A. Sturrock, J. D. Scargle, G. Walther, & M. S. Wheatland.* 523, L177 (1999)

Chromospheric Magnetic Reconnection and Its Implication for Coronal Heating. *P. A. Sturrock, C. B. Roald, & R. Wolfson.* 524, L75 (1999)

SU, KATE Y. L. The Discovery of Two New Bipolar Proto–Planetary Nebulae: IRAS 16594−4656 and IRAS 17245−3951. *Bruce J. Hrivnak, Sun Kwok, & Kate Y. L. Su.* 524, 849 (1999)

SUAREZ, J. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

SUBRAHMANYAN, R. See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

SUBRAMANIAN, PRASAD. Formation of Relativistic Outflows in Shearing Black Hole Accretion Coronae. *Prasad Subramanian, Peter A. Becker, & Demosthenes Kazanas.* 523, 203 (1999)

SUCHKOV, A. A. Evidence for a Population of Numerous Binaries with Comparably Bright Components among *Hipparcos* "Single" F Stars. *A. A. Suchkov & M. McMaster.* 524, L99 (1999)

SUGIYAMA, NAOSHI. The Sunyaev-Zeldovich Effect by Cocoons of Radio Galaxies. *Masako Yamada, Naoshi Sugiyama, & Joseph Silk.* 522, 66 (1999)

SUGIZAKI, MUTSUMI. Discovery of 715 Second Pulsations from the Faint X-Ray Source AX J170006−4157. *Ken'ichi Torii, Mutsumi Sugizaki, Takayoshi Kohmura, Takao Endo, & Fumiaki Nagase.* 523, L65 (1999)

SULKANEN, MARTIN E. Galaxy Cluster Shapes and Systematic Errors in H_0 Measured by the Sunyaev-Zeldovich Effect. *Martin E. Sulkanen.* 522, 59 (1999)

SUNTZEFF, N. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

SUSA, HAJIME. Formation and Disruption of Cosmolgical Low-Mass Objects. *Ryoichi Nishi & Hajime Susa.* 523, L103 (1999)

SUTTNER, GERHARD. Dust Coagulation in Infalling Protostellar Envelopes. I. Compact Grains. *Gerhard Suttner, Harold W. Yorke, & Doug N. C. Lin.* 524, 857 (1999)

SUZUKI, TAKERU KEN. Evolution of Beryllium and Boron in the Inhomogeneous Early Galaxy. *Takeru Ken Suzuki, Yuzuru Yoshii, & Toshitaka Kajino.* 522, L125 (1999)

SWANK, J. H. Recurrent X-Ray Emission Variations of η Carinae and the Binary Hypothesis. *K. Ishibashi, M. F. Corcoran, K. Davidson, J. H. Swank, R. Petre, S. A. Drake, A. Damineli, & S. White.* 524, 983 (1999)

SWANK, JEAN. See WOODS, PETER M., et al. Variable Spin-down in the Soft Gamma Repeater SGR 1900+14 and Correlations with Burst Activity.

SZABADOS, LASZLO. Toward an Orbit for the High-Luminosity Cepheid T Monocerotis. *Nancy Remage Evans, Kenneth Carpenter, Richard Robinson, Derck Massa, Glenn M. Wahlgren, Jozsef Vinko, & Laszlo Szabados.* 524, 379 (1999)

SZUSZKIEWICZ, EWA. Emergent Spectra from Slim Accretion Disks in Active Galactic Nuclei. *Jian-Min Wang, Ewa Szuszkiewicz, Fang-Jun Lu, & You-Yuan Zhou.* 522, 839 (1999)

TACCONI, L. J. The Molecular Gas in the Circumnuclear Region of Seyfert Galaxies. *E. Schinnerer, A. Eckart, & L. J. Tacconi.* 524, L5 (1999)

Gasdynamics in the Luminous Merger NCG 6240. *L. J. Tacconi, R. Genzel, M. Tecza, J. F. Gallimore, D. Downes, & N. Z. Scoville.* 524, 732 (1999)

TAFALLA, M. CO Depletion in the Starless Cloud Core L1544. *P. Caselli, C. M. Walmsley, M. Tafalla, L. Dore, & P. C. Myers.* 523, L165 (1999)

TAGLIAFERRI, GIANPIERO. The Brera Multiscale Wavelet *ROSAT* HRI Source Catalog. I. The Algorithm. *Davide Lazzati, Sergio Campana, Piero Rosati, Maria Rosa Panzera, & Gianpiero Tagliaferri.* 524, 414 (1999)

The Brera Multiscale Wavelet *ROSAT* HRI Source Catalog. II. Application to the HRI and First Results. *Sergio Campana, Davide Lazzati, Maria Rosa Panzera, & Gianpiero Tagliaferri.* 524, 423 (1999)

TAKAGI, TOSHINOBU. Age and Dust Degeneracy for Starburst Galaxies Solved? *Toshinobu Takagi, Nobuo Arimoto, & Vladas Vansevičius.* 523, 107 (1999)

TAKAHARA, FUMIO. A Novel Mechanism for the Formation of Electron-Positron Outflow from Hot Accretion Disks. *Tatsuya Yamasaki, Fumio Takahara, & Masaaki Kusunose.* 523, L21 (1999)

TAKAHASHI, TADAYUKI. The *ASCA* Medium-Sensitivity Survey (The GIS Catalog Project): Source Counts and Evidence for Emerging Population of Hard Sources. *Yoshihiro Ueda, Tadayuki Takahashi, Yoshitaka Ishisaki, Takaya Ohashi, & Kazuo Makishima.* 524, L11 (1999)

TAKAMIYA, T. Central Rotation Curves of Spiral Galaxies. *Y. Sofue, Y. Tutui, M. Honma, A. Tomita, T. Takamiya, J. Koda, & Y. Takeda.* 523, 136 (1999)

TAKEDA, M. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array. *M. Takeda, N. Hayashida, K. Honda, N. Inoue, K. Kadota, F. Kakimoto, K. Kamata, S. Kawaguchi, Y. Kawasaki, N. Kawasumi, E. Kusano, Y. Matsubara, K. Murakami, M. Nagano, D. Nishikawa, H. Ohoka, S. Osone, N. Sakaki, M. Sasaki, K. Shinozaki, N. Souma, M. Teshima, R. Torii, I. Tsushima, Y. Uchihori, T. Yamamoto, S. Yoshida, & H. Yoshii.* 522, 225 (1999)

TAKEDA, Y. Central Rotation Curves of Spiral Galaxies. *Y. Sofue, Y. Tutui, M. Honma, A. Tomita, T. Takamiya, J. Koda, & Y. Takeda.* 523, 136 (1999)

TAKEUCHI, AKITSUGU. Properties of Convective Instability in a Vertical Photospheric Magnetic Flux Tube. *Akitsugu Takeuchi.* 522, 518 (1999)

TAMMANN, G. A. Cepheid Calibration of the Peak Brightness of Type Ia Supernovae. IX. SN 1989B in NGC 3627. *A. Saha, Allan Sandage, G. A. Tammann, Lukas Labhardt, F. D. Macchetto, & N. Panagia.* 522, 802 (1999)

TAN, JONATHAN C. A Semiempirical Model of the Infrared Universe. *Jonathan C. Tan, Joe Silk, & Christophe Balland.* 522, 579 (1999)

TANDON, S. N. Far-Infrared Observations of the Galactic Star-forming Regions Associated with IRAS 00339+6312 and RAFGL 5111. *B. Mookerjea, S. K. Ghosh, A. D. Karnik, T. N. Rengarajan, S. N. Tandon, & R. P. Verma.* 522, 285 (1999)

TANIGUCHI, YOSHIAKI. ^{13}CO J = 1–0 Depression in Luminous Starburst Mergers, Revisited. *Yoshiaki Taniguchi, Youichi Ohyama, & D. B. Sanders.* 522, 214 (1999)

The Minor-Merger–driven Nuclear Activity in Seyfert Galaxies: A Step toward the Simple Unified Formation Mechanism of Active Galactic Nuclei in the Local Universe. *Yoshiaki Taniguchi.* 524, 65 (1999)

TANVIR, N. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

TARUYA, ATSUSHI. Stochastic Biasing and Galaxy–Mass Density Relation in the Weakly Nonlinear Regime. *Atsushi Taruya & Jiro Soda.* 522, 46 (1999)

TATEMATSU, KEN'ICHI. See MAEZAWA, HIROYUKI, et al. Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud.

TAYLOR, G. B. B2 1144+35: A Giant Low-Power Radio Galaxy with Superluminal Motion. *G. Giovannini, G. B. Taylor, E. Arbizzani, M. Bondi, W. D. Cotton, L. Feretti, L. Lara, & T. Venturi.* 522, 101 (1999)

TECZA, M. Gasdynamics in the Luminous Merger NCG 6240. *L. J. Tacconi, R. Genzel, M. Tecza, J. F. Gallimore, D. Downes, & N. Z. Scoville.* 524, 732 (1999)

TEEGARDEN, B. J. Transient Gamma-Ray Observations of Gamma-Ray Lines from Novae. I. Limits on the Positron Annihilation Line in Five Individual Novae. *M. J. Harris, J. E. Naya, B. J. Teegarden, T. L. Cline, N. Gehrels, D. M. Palmer, R. Ramaty, & H. Seifert.* 522, 424 (1999)

TEGMARK, MAX. Is the Cosmic Microwave Background Really Non-Gaussian? *Benjamin C. Bromley & Max Tegmark.* 524, L79 (1999)

TELLÉRIA, D. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

TEMPORIN, S. A New Ultradense Group of Obscured Emission-Line Galaxies. *R. Weinberger, S. Temporin, & F. Kerber.* 522, L17 (1999)

TENNYSON, J. H_2 Quadrupole and H_3^+ Emission from Uranus: The Uranian Thermosphere, Ionosphere, and Aurora. *L. M. Trafton, S. Miller, T. R. Geballe, J. Tennyson, & G. E. Ballestar.* 524, 1059 (1999)

TERZIEVA, RADOSLAVA. The Abundance of C_7^- in Diffuse Clouds. *Deborah P. Ruffle, R. P. A. Bettens, Radoslava Terzieva, & Eric Herbst.* 523, 678 (1999)

TESHIMA, M. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

THADDEUS, P. A New High-Resolution CO Map of the Inner 2.5 Arcminutes of M51. I. Streaming Motions and Spiral Structure. *S. Aalto, S. Hüttemeister, N. Z. Scoville, & P. Thaddeus.* 522, 165 (1999)

Laser Spectroscopy of the Carbon Chains HC_7H and HC_9H. *C. D. Ball, M. C. McCarthy, & P. Thaddeus.* 523, L89 (1999)

THAYER, M. R. See WIEDENBECK, M. E., et al. Constraints on the Time Delay between Nucleosynthesis and Cosmic-Ray Acceleration from Observations of Ni and Co.

THOMAS, DAVID. Projection and Galaxy Clustering Fourier Spectra. *J. N. Fry & David Thomas.* 524, 591 (1999)

THOMAS, JOHN H. Solar Interface Dynamo Models with a Realistic Rotation Profile. *J. Andrew Markiel & John H. Thomas.* 523, 827 (1999)

THOMMES, E. See THOMPSON, D., et al. The Surface Density of Extremely Red Objects.

THOMPSON, CHRISTOPHER. See WOODS, PETER M., et al. Variable Spin-down in the Soft Gamma Repeater SGR 1900+14 and Correlations with Burst Activity.

THOMPSON, D. The Surface Density of Extremely Red Objects. *D. Thompson, S. V. W. Beckwith, R. Fockenbrock, J. Fried, H. Hippelein, J.-S. Huang, B. von Kuhlmann, Ch. Leinert, K. Meisenheimer, S. Phelps, H.-J. Röser, E. Thommes, & C. Wolf.* 523, 100 (1999)

THOMPSON, I. *BVRI* Observations of the Optical Afterglow of GRB 990510. *K. Z. Stanek, P. M. Garnavich, J. Kaluzny, W. Pych, & I. Thompson.* 522, L39 (1999)

THOMPSON, WILLIAM J. Explosive Hydrogen Burning of ^{27}Si, ^{31}S, ^{35}Ar, and ^{39}Ca in Novae and X-Ray Bursts. *Christian Iliadis, Pieter M. Endt, Nikos Prantzos, & William J. Thompson.* 524, 434 (1999)

THORBURN, J. A. Lithium Isotope Ratios in Halo Stars. III. *L. M. Hobbs, J. A. Thorburn, & L. M. Rebull.* 523, 797 (1999)

THORSETT, S. E. The Triple Pulsar System PSR B1620−26 in M4. *S. E. Thorsett, Z. Arzoumanian, F. Camilo, & A. G. Lyne.* 523, 763 (1999)

THORSTENSEN, JOHN R. Stellar Masses, Kinematics, and White Dwarf Composition for Three Close DA+dMe Binaries. *Stéphane Vennes, John R. Thorstensen, & Elisha F. Polomski.* 523, 386 (1999)

TIELENS, A. G. G. M. See GERAKINES, P. A., et al. Observations of Solid Carbon Dioxide in Molecular Clouds with the *Infrared Space Observatory*.

TIERSCH, H. Radio Emission of Shakhbazian Compact Galaxy Groups. *H. M. Tovmassian, V. H. Chavushyan, O. V. Verkhodanov, & H. Tiersch.* 523, 87 (1999)

TITARCHUK, LEV. Kilohertz Quasi-periodic Oscillations in Neutron Star Binaries Modeled as Keplerian Oscillations in a Rotating Frame of Reference. *Vladimir Osherovich & Lev Titarchuk.* 522, L113 (1999)

Interpretation of ~35 Hz QPO in the Atoll Source 4U 1702−42 as a Low Branch of the Keplerian Oscillations under the Influence of the Coriolis Force. *Vladimir Osherovich & Lev Titarchuk.* 523, L73 (1999)

TKACHEV, I. Ω_B and Ω_0 from MACHOs and Local Group Dynamics. *G. Steigman & I. Tkachev.* 522, 793 (1999)

TOMITA, A. Central Rotation Curves of Spiral Galaxies. *Y. Sofue, Y. Tutui, M. Honma, A. Tomita, T. Takamiya, J. Koda, & Y. Takeda.* 523, 136 (1999)

TOMKIN, JOCELYN. Rubidium in Metal-deficient Disk and Halo Stars. *Jocelyn Tomkin & David L. Lambert.* 523, 234 (1999)

TORBET, E. See MILLER, A. D., et al. A Measurement of the Angular Power Spectrum of the Cosmic Microwave Background from l = 100 to 400.

TORII, KEN'ICHI. Discovery of 715 Second Pulsations from the Faint X-Ray Source AX J170006−4157. *Ken'ichi Torii, Mutsumi Sugizaki, Takayoshi Kohmura, Takao Endo, & Fumiaki Nagase.* 523, L65 (1999)

Spin-down of the 65 Millisecond X-Ray Pulsar in the Supernova Remnant G11.2−0.3. *Ken'ichi Torii, Hiroshi Tsunemi, Tadayasu Dotani, Kazuhisa Mitsuda, Nobuyuki Kawai, Kenzo Kinugasa, Yoshitaka Saito, & Shinpei Shibata.* 523, L69 (1999)

TORII, R. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

TOSCANO, M. Parallax of PSR J1744−1134 and the Local Interstellar Medium. *M. Toscano, M. C. Britton, R. N. Manchester, M. Bailes, J. S. Sandhu, S. R. Kulkarni, & S. B. Anderson.* 523, L171 (1999)

TOVMASSIAN, H. M. Radio Emission of Shakhbazian Compact Galaxy Groups. *H. M. Tovmassian, V. H. Chavushyan, O. V. Verkhodanov, & H. Tiersch.* 523, 87 (1999)

TOZZI, PAOLO. Dark Matter Substructure within Galactic Halos. *Ben Moore, Sebastiano Ghigna, Fabio Governato, George Lake, Thomas Quinn, Joachim Stadel, & Paolo Tozzi.* 524, L19 (1999)

TRAFTON, L. M. H_2 Quadrupole and H_3^+ Emission from Uranus: The Uranian Thermosphere, Ionosphere, and Aurora. *L. M. Trafton, S. Miller, T. R. Geballe, J. Tennyson, & G. E. Ballestar.* 524, 1059 (1999)

TRAN, H. T. See MILLER, A. D., et al. A Measurement of the Angular Power Spectrum of the Cosmic Microwave Background from l = 100 to 400.

TRAN, KIM-VY H. The Velocity Dispersion of MS 1054−03: A Massive Galaxy Cluster at High Redshift. *Kim-Vy H. Tran, Daniel D. Kelson, Peter van Dokkum, Marijn Franx, Garth D. Illingworth, & Daniel Magee.* 522, 39 (1999)

TREU, TOMMASO. A NICMOS Search for High-Redshift Elliptical Galaxy Candidates. *Tommaso Treu & Massimo Stiavelli.* 524, L27 (1999)

TREUHAFT, R. N. The Proper Motion of Sagittarius A*. I. First VLBA Results. *M. J. Reid, A. C. S. Readhead, R. C. Vermeulen, & R. N. Treuhaft.* 524, 816 (1999)

TRIPICCO, MICHAEL J. On the Sensitivity of the Cepheid Period-Luminosity Relation to Variations of Metallicity. *Allan Sandage, R. A. Bell, & Michael J. Tripicco.* 522, 250 (1999)

TSINGANOS, K. The Radial and Angular Variation of the Electron Density in the Solar Corona. *P. T. Gallagher, M. Mathioudakis, F. P. Keenan, K. J. H. Phillips, & K. Tsinganos.* 524, L133 (1999)

TSUNEMI, HIROSHI. Spin-down of the 65 Millisecond X-Ray Pulsar in the Supernova Remnant G11.2−0.3. *Ken'ichi Torii, Hiroshi Tsunemi, Tadayasu Dotani, Kazuhisa Mitsuda, Nobuyuki Kawai, Kenzo Kinugasa, Yoshitaka Saito, & Shinpei Shibata.* 523, L69 (1999)

TSURIBE, TORU. Criteria for Fragmentation of Rotating Isothermal Clouds Revisited. *Toru Tsuribe & Shu-Ichiro Inutsuka.* 523, L155 (1999)

TSURUTANI, B. T. Evolution of Nonlinear Alfvén Waves in Streaming Inhomogeneous Plasmas. *B. Buti, V. L. Galinski, V. I. Shevchenko, G. S. Lakhina, B. T. Tsurutani, B. E. Goldstein, P. Diamond, & M. V. Medvedev.* 523, 849 (1999)

TSUSHIMA, I. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

TUCKER, DOUGLAS L. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

Star Formation in Las Campanas Compact Groups. *Sahar S. Allam, Douglas L. Tucker, Huan Lin, & Yasuhiro Hashimoto.* 522, L89 (1999)

TUFTE, S. L. WHAM Observations of Hα, [S II], and [N II] toward the Orion and Perseus Arms: Probing the Physical Conditions of the Warm Ionized Medium. *L. M. Haffner, R. J. Reynolds, & S. L. Tufte.* 523, 223 (1999)

TURCAN, D. On X-Ray Variability in Seyfert Galaxies. *T. J. Turner, I. M. George, K. Nandra, & D. Turcan.* 524, 667 (1999)

TURNER, ANNE. See SAKAI, SHOKO, et al. The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319.

TURNER, N. J. Driving Outflows from Young Stars through the Effects of Internal Disk Fields. *N. J. Turner, P. Bodenheimer, & M. Rózyczka.* 524, 129 (1999)

TURNER, T. J. The Properties of the Relativistic Iron K-Line in NGC 3516. *K. Nandra, I. M. George, R. F. Mushotzky, T. J. Turner, & T. Yaqoob.* 523, L17 (1999)

On X-Ray Variability in Seyfert Galaxies. *T. J. Turner, I. M. George, K. Nandra, & D. Turcan.* 524, 667 (1999)

TURNSHEK, DAVID A. *Hubble Space Telescope* Faint Object Spectrograph Observations of a Unique Grouping of Five QSOs: The Sizes and Shapes of Low-z Lyα Forest Absorbers. *Eric M. Monier, David A. Turnshek, & Cyril Hazard.* 522, 627 (1999)

TUTUI, Y. Central Rotation Curves of Spiral Galaxies. *Y. Sofue, Y. Tutui, M. Honma, A. Tomita, T. Takamiya, J. Koda, & Y. Takeda.* 523, 136 (1999)

UBERTINI, P. A New Bursting X-Ray Transient: SAX J1750.8−2900. *L. Natalucci, R. Cornelisse, A. Bazzano, M. Cocchi, P. Ubertini, J. Heise, J. J. M. in 't Zand, & E. Kuulkers.* 523, L45 (1999)

UCHIHORI, Y. See TAKEDA, M., et al. Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array.

UDOMPRASERT, P. See KULKARNI, S. R., et al. Discovery of a Radio Flare from GRB 990123.

UEDA, Y. Detection of Hard X-Rays from a Class I Protostar in the HH 24-26 Region in the Orion Molecular Cloud. *H. Ozawa, F. Nagase, Y. Ueda, T. Dotani, & M. Ishida.* 523, L81 (1999)

UEDA, YOSHIHIRO. The *ASCA* Medium-Sensitivity Survey (The GIS Catalog Project): Source Counts and Evidence for Emerging Population of Hard Sources. *Yoshihiro Ueda, Tadayuki Takahashi, Yoshitaka Ishisaki, Takaya Ohashi, & Kazuo Makishima.* 524, L11 (1999)

UENO, SHIRO. An *RXTE* Observation of NGC 6300: A New Bright Compton Reflection–dominated Seyfert 2 Galaxy. *Karen M. Leighly, Jules Halpern, Hisamitsu Awaki, Massimo Cappi, Shiro Ueno, & Joachim Siebert.* 522, 209 (1999)

UGGLA, C. An Almost Isotropic Cosmic Microwave Temperature Does Not Imply an Almost Isotrpic Universe. *U. S. Nilsson, C. Uggla, J. Wainwright, & W. C. Lim.* 522, L1 (1999)

ULMER, M. P. A Search for Pulse-to-Pulse Variability of the Crab Pulsar. *Brian L. Patt, M. P. Ulmer, William Zhang, James M. Cordes, & Z. Arzoumanian.* 522, 440 (1999)

ULMSCHNEIDER, P. Two-Component Theoretical Chromosphere Models for K Dwarfs of Different Magnetic Activity: Exploring the Ca II Emission–Stellar Rotation Relationship. *M. Cuntz, W. Rammacher, P. Ulmschneider, Z. E. Musielak, & S. H. Saar.* 522, 1053 (1999)

UMEDA, HIDEYUKI. The Origin of the Diversity of Type Ia Supernovae and the Environmental Effects. *Hideyuki Umeda, Ken'ichi Nomoto, Chiaki Kobayashi, Izumi Hachisu, & Mariko Kato.* 522, L43 (1999)

VAILE, R. A. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

VALENTIJN, EDWIN A. First Extragalactic Direct Detection of Large-Scale Molecular Hydrogen in the Disk of NGC 891. *Edwin A. Valentijn & Paul P. van der Werf.* 522, L29 (1999)

VALENZUELA, OCTAVIO. Where Are the Missing Galactic Satellites? *Anatoly Klypin, Andrey V. Kravtsov, Octavio Valenzuela, & Francisco Prada.* 522, 82 (1999)

VAN ALTENA, WILLIAM F. A Large Local Rotational Speed for the Galaxy Found from Proper Motions: Implications for the Mass of the Milky Way. *René A. Méndez, Imants Platais, Terrence M. Girard, Vera Kozhurina-Platais, & William F. van Altena.* 524, L39 (1999)

VAN BUREN, D. The [N II] Kinematics of R Aquarii. *J. M. Hollis, S. N. Vogel, D. Van Buren, J. P. Strong, R. G. Lyon, & J. E. Dorband.* 522, 297 (1999)

VAN BUREN, DAVE. An *Infrared Space Observatory* Upper Limit to the Low-Mass Star Halo in the Edge-on Galaxy NGC 4565. *Charles Beichman, George Helou, Dave Van Buren, Ken Ganga, & F. X. Desert.* 523, 559 (1999)

VAN DER KLIS, MICHIEL. The Discovery of a 7–14 Hz Quasi-periodic Oscillation in the X-Ray Transient XTE J1806−246. *Rudy Wijnands & Michiel van der Klis.* 522, 965 (1999)

VAN DER TAK, FLORIS F. S. The Impact of the Massive Young Star GL 2591 on Its Circumstellar Material: Temperature, Density, and Velocity Structure. *Floris F. S. van der Tak, Ewine F. van Dishoeck, Neal J. Evans II, Eric J. Bakker, & Geoffrey A. Blake.* 522, 991 (1999)

VAN DER WERF, PAUL P. First Extragalactic Direct Detection of Large-Scale Molecular Hydrogen in the Disk of NGC 891. *Edwin A. Valentijn & Paul P. van der Werf.* 522, L29 (1999)

VAN DISHOECK, E. F. See GERAKINES, P. A., et al. Observations of Solid Carbon Dioxide in Molecular Clouds with the *Infrared Space Observatory*.

VAN DISHOECK, EWINE F. The Impact of the Massive Young Star GL 2591 on Its Circumstellar Material: Temperature, Density, and Velocity Structure. *Floris F. S. van der Tak, Ewine F. van Dishoeck, Neal J. Evans II, Eric J. Bakker, & Geoffrey A. Blake.* 522, 991 (1999)

VAN DOKKUM, PETER. The Velocity Dispersion of MS 1054−03: A Massive Galaxy Cluster at High Redshift. *Kim-Vy H. Tran, Daniel D. Kelson, Peter van Dokkum, Marijn Franx, Garth D. Illingworth, & Daniel Magee.* 522, 39 (1999)

VAN LEEUWEN, FLOOR. Analysis of the *Hipparcos* Measurements of υ Andromedae: A Mass Estimate of Its Outermost Known Planetary Companion. *Tsevi Mazeh, Shay Zucker, Andrea Dalla Torre, & Floor van Leeuwen.* 522, L149 (1999)

VAN PARADIJS, J. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

See WIJERS, R. A. M. J., et al. Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope.

Where Is SGR 1806−20? *K. Hurley, C. Kouveliotou, T. Cline, E. Mazets, S. Golenetskii, D. D. Frederiks, & J. van Paradijs.* 523, L37 (1999)

See BRIGGS, M. S., et al. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*.

See HURLEY, K., et al. A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes.

Evidence for an Early High-Energy Afterglow Observed with BATSE from GRB 980923. *T. W. Giblin, J. van Paradijs, C. Kouveliotou, V. Connaughton, R. A. M. J. Wijers, M. S. Briggs, R. D. Preece, & G. J. Fishman.* 524, L47 (1999)

VAN PARADIJS, JAN. See WOODS, PETER M., et al. Variable Spin-down in the Soft Gamma Repeater SGR 1900+14 and Correlations with Burst Activity.

VANSEVIČIUS, VLADAS. Age and Dust Degeneracy for Starburst Galaxies Solved? *Toshinobu Takagi, Nobuo Arimoto, & Vladas Vansevičius.* 523, 107 (1999)

VÁROSI, FRANK. Analytical Approximations for Calculating the Escape and Absorption of Radiation in Clumpy Dusty Environments. *Frank Városi & Eli Dwek.* 523, 265 (1999)

VASISHT, G. On the Spin History of the X-Ray Pulsar in Kes 73: Further Evidence for an Ultramagnetized Neutron Star. *E. V. Gotthelf, G. Vasisht, & T. Dotani.* 522, L49 (1999)

VEILLEUX, S. The Very Extended Ionized Nebula around the Quasar MR 2251−178. *P. L. Shopbell, S. Veilleux, & J. Bland-Hawthorn.* 524, L83 (1999)

VEILLEUX, SYLVAIN. Optical Spectroscopy of the *IRAS* 1 Jy Sample of Ultraluminous Infrared Galaxies. *Sylvain Veilleux, D.-C. Kim, & D. B. Sanders.* 522, 113 (1999)

New Results from a Near-Infrared Search for Hidden Broad-Line Regions in Ultraluminous Infrared Galaxies. *Sylvain Veilleux, D. B. Sanders, & D.-C. Kim.* 522, 139 (1999)

VENNES, STÉPHANE. Stellar Masses, Kinematics, and White Dwarf Composition for Three Close DA+dMe Binaries. *Stéphane Vennes, John R. Thorstensen, & Elisha F. Polomski.* 523, 386 (1999)

VENTURA, PAOLO. Modeling Lithium-rich Carbon Stars in the Large Magellanic Cloud: An Independent Distance Indicator? *Paolo Ventura, Francesca D'Antona, & Italo Mazzitelli.* 524, L111 (1999)

VENTURI, T. B2 1144+35: A Giant Low-Power Radio Galaxy with Superluminal Motion. *G. Giovannini, G. B. Taylor, E. Arbizzani, M. Bondi, W. D. Cotton, L. Feretti, L. Lara, & T. Venturi.* 522, 101 (1999)

VERKHODANOV, O. V. Radio Emission of Shakhbazian Compact Galaxy Groups. *H. M. Tovmassian, V. H. Chavushyan, O. V. Verkhodanov, & H. Tiersch.* 523, 87 (1999)

VERMA, R. P. Far-Infrared Observations of the Galactic Star-forming Regions Associated with IRAS 00339+6312 and RAFGL 5111. *B. Mookerjea, S. K. Ghosh, A. D. Karnik, T. N. Rengarajan, S. N. Tandon, & R. P. Verma.* 522, 285 (1999)

VERMAAK, P. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

VERMEULEN, R. C. The Proper Motion of Sagittarius A*. I. First VLBA Results. *M. J. Reid, A. C. S. Readhead, R. C. Vermeulen, & R. N. Treuhaft.* 524, 816 (1999)

VIAL, J.-C. Transition-Region Network Boundaries in the Quiet Sun: Width Variation with Temperature as Observed with CDS on *SOHO*. *S. Patsourakos, J.-C. Vial, A. H. Gabriel, & N. Bellamine.* 522, 540 (1999)

VICENTE, B. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

VIDALI, G. Molecular Hydrogen on Astrophysically Relevant Surfaces. *N. Katz, I. Furman, O. Biham, V. Pirronello, & G. Vidali.* 522, 305 (1999)

VIEGAS, S. M. A Multicloud Warm-Absorber Model for NGC 4051. *M. Contini & S. M. Viegas.* 523, 114 (1999)

VIEIRA, K. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

VIEIRA, M. Rate Coefficients for Ro-vibrational Transitions in H_2 Due to Collisions with He. *N. Balakrishnan, M. Vieira, J. F. Babb, A. Dalgarno, J. F. Forrey, & S. Lepp.* 524, 1122 (1999)

VIETRI, MARIO. Correlations in the Quasi-periodic Oscillation Frequencies of Low-Mass X-Ray Binaries and the Relativistic Precession Model. *Luigi Stella, Mario Vietri, & Sharon M. Morsink.* 524, L63 (1999)

VILLAVER, EVA. Jets, Knots, and Tails in Planetary Nebulae: NGC 3918, K1-2, and Wray 17-1. *Romano L. M. Corradi, Mario Perinotto, Eva Villaver, Antonio Mampaso, & Denise R. Gonçalves.* 523, 721 (1999)

VILLUMSEN, JENS VERNER. A Comparison of Simple Mass Estimators for Galaxy Clusters. *Tereasa G. Brainerd, Candace Oaxaca Wright, David M. Goldberg, & Jens Verner Villumsen.* 524, 9 (1999)

VINKO, JOZSEF. Toward an Orbit for the High-Luminosity Cepheid T Monocerotis. *Nancy Remage Evans, Kenneth Carpenter, Richard Robinson, Derck Massa, Glenn M. Wahlgren, Jozsef Vinko, & Laszlo Szabados.* 524, 379 (1999)

VIVAS, K. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

VOGEL, P. Probing *r*-Process Production of Nuclei beyond ^{209}Bi with Gamma Rays. *Y.-Z. Qian, P. Vogel, & G. J. Wasserburg.* 524, 213 (1999)

VOGEL, S. N. The [N II] Kinematics of R Aquarii. *J. M. Hollis, S. N. Vogel, D. Van Buren, J. P. Strong, R. G. Lyon, & J. E. Dorband.* 522, 297 (1999)

VOGT, STEVEN S. An Upper Limit on the Reflected Light from the Planet Orbiting the Star τ Bootis. *David Charbonneau, Robert W. Noyes, Sylvain G. Korzennik, Peter Nihenson, Saurabh Jha, Steven S. Vogt, & Robert I. Kibrick.* 522, L145 (1999)

VOIT, G. MARK. Ω_m from the Temperature-Redshift Distribution of EMSS Clusters of Galaxies. *Megan Donahue & G. Mark Voit.* 523, L137 (1999)

VON KUHLMANN, B. See THOMPSON, D., et al. The Surface Density of Extremely Red Objects.

VON ROSENVINGE, T. T. See WIEDENBECK, M. E., et al. Constraints on the Time Delay between Nucleosynthesis and Cosmic-Ray Acceleration from Observations of Ni and Co.

VOROBYOV, EDUARD. Chemical Abundance Gradients in the Star-forming Ring Galaxies. *Vladimir Korchagin, Eduard Vorobyov, & Y. D. Mayya.* 522, 767 (1999)

VRBA, F. See HURLEY, K., et al. A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes.

VRBA, FREDERICK J. A Very Low Luminosity, Very Cool, DC White Dwarf. *Hugh C. Harris, Conard C. Dahn, Frederick J. Vrba, Arne A. Henden, James Liebert, Gary D. Schmidt, & I. Neill Reid.* 524, 1000 (1999)

VREESWIJK, P. M. The X-Ray, Optical, and Infrared Counterpart to GRB 980703. *P. M. Vreeswijk, T. J. Galama, A. Owens, T. Oosterbroek, T. R. Geballe, J. van Paradijs, P. J. Groot, C. Kouveliotou, T. Koshut, N. Tanvir, R. A. M. J. Wijers, E. Pian, E. Palazzi, F. Frontera, N. Masetti, C. Robinson, M. Briggs, J. J. M. in 't Zand, J. Heise, L. Piro, E. Costa, M. Feroci, L. A. Antonelli, K. Hurley, J. Greiner, D. A. Smith, A. M. Levine, Y. Lipkin, E. Leibowitz, C. Lidman, A. Pizzella, H. Böhnhardt, V. Doublier, S. Chaty, I. Smail, A. Blain, J. H. Hough, S. Young, & N. Suntzeff.* 523, 171 (1999)

See WIJERS, R. A. M. J., et al. Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope.

WACHTER, STEFANIE. Infrared Candidates for the Intense Galactic X-Ray Source GX 17+2. *Eric W. Deutsch, Bruce Margon, Scott F. Anderson, Stefanie Wachter, & W. M. Goss.* 524, 406 (1999)

WADDELL, PATRICK. See STRAUSS, MICHAEL A., et al. The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data.

WAHLGREN, GLENN M. Toward an Orbit for the High-Luminosity Cepheid T Monocerotis. *Nancy Remage Evans, Kenneth Carpenter, Richard Robinson, Derck Massa, Glenn M. Wahlgren, Jozsef Vinko, & Laszlo Szabados.* 524, 379 (1999)

WAINWRIGHT, J. An Almost Isotropic Cosmic Microwave Temperature Does Not Imply an Almost Isotrpic Universe. *U. S. Nilsson, C. Uggla, J. Wainwright, & W. C. Lim.* 522, L1 (1999)

WALKER, A. B. C., II. Observation and Modeling of the Solar Transition Region. I. Multi-Spectral Solar Telescope Array Observations. *Hakeem M. Oluseyi, A. B. C. Walker II, Jason Porter, Richard B. Hoover, & Troy W. Barbee, Jr.* 524, 1105 (1999)

WALKER, TERRY P. Constraining the Cosmic Abundance of Stellar Remnants with Multi-TeV Gamma Rays. *David S. Graff, Katherine Freese, Terry P. Walker, & Marc H. Pinsonneault.* 523, L77 (1999)

WALLACE, LLOYD. The MgH $B'\ ^2\Sigma^+$–$X\ ^2\Sigma^+$ Transition: A New Tool for Studying Magnesium Isotope Abundances. *Lloyd Wallace, Kenneth Hinkle, Gang Li, & Peter Bernath.* 524, 454 (1999)

WALMSLEY, C. M. CO Depletion in the Starless Cloud Core L1544. *P. Caselli, C. M. Walmsley, M. Tafalla, L. Dore, & P. C. Myers.* 523, L165 (1999)

WALTERBOS, RENÉ A. M. Diffuse Ionized Gas in Edge-on Spiral Galaxies: Extraplanar and Outer Disk Hα Emission. *Charles G. Hoopes, René A. M. Walterbos, & Richard J. Rand.* 522, 669 (1999)

WALTHER, G. Rotational Signature and Possible *r*-Mode Signature in the Gallex Solar Neutrino Data. *P. A. Sturrock, J. D. Scargle, G. Walther, & M. S. Wheatland.* 523, L177 (1999)

WANAJO, SHINYA. Nucleosynthesis on ONeMg Novae: Models versus Observations to Constrain the Masses of ONeMg White Dwarfs and Their Envelopes. *Shinya Wanajo, Masa-aki Hashimoto, & Ken'ichi Nomoto.* 523, 409 (1999)

WANG, J. C. L. Resonant Cyclotron Radiation Transfer Model Fits to Spectra from Gamma-Ray Burst GRB 870303. *P. E. Freeman, D. Q. Lamb, J. C. L. Wang, I. Wasserman, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 772 (1999)

WANG, JIAN-MIN. Emergent Spectra from Slim Accretion Disks in Active Galactic Nuclei. *Jian-Min Wang, Ewa Szuszkiewicz, Fang-Jun Lu, & You-Yuan Zhou.* 522, 839 (1999)

WANG, JUN-XIAN. The Broad Fe K-Line Profile in NGC 4151. *Jun-Xian Wang, You-Yuan Zhou, & Ting-Gui Wang.* 523, L129 (1999)

WANG, L. Jet-induced Explosions of Core Collapse Supernovae. *A. M. Khokhlov, P. A. Höflich, E. S. Oran, J. C. Wheeler, L. Wang, & A. Yu. Chtchelkanova.* 524, L107 (1999)

WANG, Q. DANIEL. An Ultradeep High-Resolution X-Ray Image of M101: The X-Ray Source Population in a Late-Type Spiral. *Q. Daniel Wang, Stefan Immler, & Wolfgang Pietsch.* 523, 121 (1999)

WANG, TING-GUI. The Broad Fe K-Line Profile in NGC 4151. *Jun-Xian Wang, You-Yuan Zhou, & Ting-Gui Wang.* 523, L129 (1999)

WARK, R. M. See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

WARREN, H. P. Morphology of the Quiet Solar Upper Atmosphere in the $4 \times 10^4 < T_e < 1.4 \times 10^6$ K Temperature Regime. *U. Feldman, K. G. Widing, & H. P. Warren.* 522, 1133 (1999)

WASSERBURG, G. J. Circumstellar Hibonite and Corundum and Nucleosynthesis in Asymptotic Giant Branch Stars. *Byeon-Gak Choi, G. J. Wasserburg, & Gary R. Huss.* 522, L133 (1999)

Probing *r*-Process Production of Nuclei beyond ^{209}Bi with Gamma Rays. *Y.-Z. Qian, P. Vogel, & G. J. Wasserburg.* 524, 213 (1999)

WASSERMAN, I. Resonant Cyclotron Radiation Transfer Model Fits to Spectra from Gamma-Ray Burst GRB 870303. *P. E. Freeman, D. Q. Lamb, J. C. L. Wang, I. Wasserman, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 772 (1999)

WASSERMAN, IRA. Precession of Isolated Neutron Stars. I. Effects of Imperfect Pinning. *Armen Sedrakian, Ira Wasserman, & James M. Cordes.* 524, 341 (1999)

WATANABE, TETSUYA. Variation of Thermal Structure with Height of a Solar Active Region Derived from *SOHO* CDS and *Yohkoh* BCS Observations. *Alphonse C. Sterling, C. D. Pike, Helen E. Mason, Tetsuya Watanabe, & Spiro K. Antiochos.* 524, 1096 (1999)

WATSON, P. G. Magnetic Reconnection Solutions in the Presence of Multiple Nulls. *I. J. D. Craig, R. B. Fabling, J. Heerikhuisen, & P. G. Watson.* 523, 838 (1999)

WATSON, R. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

WEAVER, KIMBERLY A. Very Extended X-Ray and Hα Emission in M82: Implications for the Superwind Phenomenon. *Matthew D. Lehnert, Timothy M. Heckman, & Kimberly A. Weaver.* 523, 575 (1999)

WEBB, J. K. The Gaseous Extent of Galaxies and the Origin of Lyα Absorption Systems. IV. Lyα Absorbers Arising in a Galaxy Group. *A. Ortiz-Gill, K. M. Lanzetta, J. K. Webb, X. Barcons, & A. Fernández-Soto.* 523, 72 (1999)

WEBSTER, R. L. See BANKS, G. D., et al. New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group.

WEGNER, GARY. See FREUDLING, WOLFRAM, et al. Large-Scale Power Spectrum and Cosmological Parameters from SFI Peculiar Velocities.

WEINBERG, DAVID H. Closing In on Ω_M: The Amplitude of Mass Fluctuations from Galaxy Clusters and the Lyα Forest. *David H. Weinberg, Rupert A. C. Croft, Lars Hernquist, Neal Katz, & Max Pettini.* 522, 563 (1999)

The Clustering of High-Redshift Galaxies in the Cold Dark Matter Scenario. *Neal Katz, Lars Hernquist, & David H. Weinberg.* 523, 463 (1999)

WEINBERGER, R. A New Ultradense Group of Obscured Emission-Line Galaxies. *R. Weinberger, S. Temporin, & F. Kerber.* 522, L17 (1999)

WEINER, BENJAMIN J. The Properties of the Galactic Bar Implied by Gas Kinematics in the Inner Milky Way. *Benjamin J. Weiner & J. A. Sellwood.* 524, 112 (1999)

WELCH, CHARLES A. Fe II Bubbles in the Young Planetary Nebula Hubble 12. *Charles A. Welch, A. Frank, Judith L. Pipher, W. J. Forrest, & Charles E. Woodward.* 522, L69 (1999)

WELSCH, BRIAN T. Statistical Properties of Magnetic Separators in Model Active Regions. *Brian T. Welsch & Dana W. Longcope.* 522, 1117 (1999)

WELSH, WILLIAM F. The Quiescent Accretion Disk in IP Pegasi at Near-Infrared Wavelengths. *C. S. Froning, E. L. Robinson, William F. Welsh, & Janet H. Wood.* 523, 399 (1999)

WEST, J. B. Measurement of the Absolute Photoionization Cross Section of C^+ near Threshold. *H. Kjeldsen, F. Folkmann, J. E. Hansen, H. Knudsen, M. S. Rasmussen, J. B. West, & T. Andersen.* 524, L143 (1999)

WHEATLAND, M. S. Rotational Signature and Possible *r*-Mode Signature in the Gallex Solar Neutrino Data. *P. A. Sturrock, J. D. Scargle, G. Walther, & M. S. Wheatland.* 523, L177 (1999)

WHEELER, J. C. The Role of Kinetic Energy Flux in the Convective Urca Process. *J. Stein, Z. Barkat, & J. C. Wheeler.* 523, 381 (1999)

Jet-induced Explosions of Core Collapse Supernovae. *A. M. Khokhlov, P. A. Höflich, E. S. Oran, J. C. Wheeler, L. Wang, & A. Yu. Chtchelkanova.* 524, L107 (1999)

WHITE, RICHARD L. What Determines the Depth of Broad Absorption Lines? Keck HIRES Observations of BALQSO 1603+3002. *Nahum Arav, Robert H. Becker, Sally A. Laurent-Muehleisen, Michael D. Gregg, Richard L. White, Michael S. Brotherton, & Martijn de Kool.* 524, 566 (1999)

WHITE, S. Recurrent X-Ray Emission Variations of η Carinae and the Binary Hypothesis. *K. Ishibashi, M. F. Corcoran, K. Davidson, J. H. Swank, R. Petre, S. A. Drake, A. Damineli, & S. White.* 524, 983 (1999)

WHITE, S. M. Multiple Components in the Millimeter Emission of a Solar Flare. *J.-P. Raulin, S. M. White, M. R. Kundu, A. V. R. Silva, & K. Shibasaki.* 522, 547 (1999)

WHITNEY, BARBARA A. Forming the Dusty Ring in HR 4796A. *Scott J. Kenyon, Kenneth Wood, Barbara A. Whitney, & Michael J. Wolff.* 524, L119 (1999)

WHITTET, D. C. B. See GERAKINES, P. A., et al. Observations of Solid Carbon Dioxide in Molecular Clouds with the *Infrared Space Observatory*.

WHITTLE, MARK. *Hubble Space Telescope*/Faint Object Spectrograph Spectroscopy of Spatially Resolved Narrow-Line Regions in the Seyfert 2 Galaxies NGC 2110 and NGC 5929. *Pierre Ferruit, Andrew S. Wilson, Mark Whittle, Chris Simpson, John S. Mulchaey, & Gary J. Ferland.* 523, 147 (1999)

WIDING, K. G. Morphology of the Quiet Solar Upper Atmosphere in the $4 \times 10^4 < T_e < 1.4 \times 10^6$ K Temperature Regime. *U. Feldman, K. G. Widing, & H. P. Warren.* 522, 1133 (1999)

WIEDENBECK, M. E. Constraints on the Time Delay between Nucleosynthesis and Cosmic-Ray Acceleration from Observations of Ni and Co. *M. E. Wiedenbeck, W. R. Binns, E. R. Christian, A. C. Cummings, B. L. Dougherty, P. L. Hink, J. Klarmann, R. A. Leske, M. Lijowski, R. A. Mewaldt, E. C. Stone, M. R. Thayer, T. T. von Rosenvinge, & N. E. Yanasak.* 523, L61 (1999)

WIERINGA, M. H. See HARRISON, F. A., et al. Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet.

WIESCHER, MICHAEL. The Rapid Proton Process Ashes from Stable Nuclear Burning on an Accreting Neutron Star. *Hendrik Schatz, Lars Bildsten, Andrew Cumming, & Michael Wiescher.* 524, 1014 (1999)

WIJERS, R. A. M. J. See VREESWIJK, P. M., et al. The X-Ray, Optical, and Infrared Counterpart to GRB 980703.

Physical Parameters of GRB 970508 and GRB 971214 from Their Afterglow Synchrotron Emission. *R. A. M. J. Wijers & T. J. Galama.* 523, 177 (1999)

Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope. *R. A. M. J. Wijers, P. M. Vreeswijk, T. J. Galama, E. Rol, J. van Paradijs, C. Kouveliotou, T. Giblin, N. Masetti, E. Palazzi, E. Pian, F. Frontera, L. Nicastro, R. Falomo, P. Soffitta, & L. Piro.* 523, L33 (1999)

See BRIGGS, M. S., et al. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*.

Evidence for an Early High-Energy Afterglow Observed with BATSE from GRB 980923. *T. W. Giblin, J. van Paradijs, C. Kouveliotou, V. Connaughton, R. A. M. J. Wijers, M. S. Briggs, R. D. Preece, & G. J. Fishman.* 524, L47 (1999)

WIJNANDS, RUDY. The Discovery of a 7–14 Hz Quasi-periodic Oscillation in the X-Ray Transient XTE J1806−246. *Rudy Wijnands & Michiel van der Klis.* 522, 965 (1999)

WILLIAMS, A. See ALBROW, M. D., et al. Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28.

See ALBROW, M. D., et al. A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events.

WILLIAMS, G. G. See SCHAEFER, BRADLEY E., et al. Discovery of the Optical Transient of GRB 990308.

WILLIAMS, JONATHAN P. The Spectral Correlation Function: A New Tool for Analyzing Spectral Line Maps. *Erik W. Rosolowsky, Alyssa A. Goodman, David J. Wilner, & Jonathan P. Williams.* 524, 887 (1999)

WILLIAMS, O. R. See BRIGGS, M. S., et al. Observations of GRB 990123 by the *Compton Gamma Ray Observatory*.

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A Measurement of the Angular Power Spectrum of the Cosmic Microwave Background from $l = 100$ to 400. *A. D. Miller, R. Caldwell, M. J. Devlin, W. B. Dorwart, T. Herbig, M. R. Nolta, L. A. Page, J. Puchalla, E. Torbet, & H. T. Tran.* 524, L1 (1999)

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Observations of the Binary Microlens Event MACHO 98-SMC-1 by the Microlensing Planet Search Collaboration. *S. H. Rhie, A. C. Becker, D. P. Bennett, P. C. Fragile, B. R. Johnson, L. J. King, B. A. Peterson, J. Quinn, & (The Microlensing Planet Search Collaboration.* 522, 1037 (1999)

Large-Scale Power Spectrum and Cosmological Parameters from SFI Peculiar Velocities. *Wolfram Freudling, Idit Zehavi, Luiz N. da Costa, Avishai Dekel, Amiram Eldar, Riccardo Giovanelli, Martha P. Haynes, John J. Salzer, Gary Wegner, & Saleem Zaroubi.* 523, 1 (1999)

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Ω_m from the Temperature-Redshift Distribution of EMSS Clusters of Galaxies. *Megan Donahue & G. Mark Voit.* 523, L137 (1999)

A Comparison of Simple Mass Estimators for Galaxy Clusters. *Tereasa G. Brainerd, Candace Oaxaca Wright, David M. Goldberg, & Jens Verner Villumsen.* 524, 9 (1999)

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Constraining the Cosmic Abundance of Stellar Remnants with Multi-TeV Gamma Rays. *David S. Graff, Katherine Freese, Terry P. Walker, & Marc H. Pinsonneault.* 523, L77 (1999)

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A Complete Set of Solutions for Caustic Crossing Binary Microlensing Events. *M. D. Albrow, J.-P. Beaulieu, J. A. R. Caldwell, D. L. DePoy, M. Dominik, B. S. Gaudi, A. Gould, J. Greenhill, K. Hill, S. Kane, R. Martin, J. Menzies, R. M. Naber, R. W. Pogge, K. R. Pollard, P. D. Sackett, K. C. Sahu, P. Vermaak, R. Watson, & A. Williams (The PLANET Collaboration).* 522, 1022 (1999)

Observations of the Binary Microlens Event MACHO 98-SMC-1 by the Microlensing Planet Search Collaboration. *S. H. Rhie, A. C. Becker, D. P. Bennett, P. C. Fragile, B. R. Johnson, L. J. King, B. A. Peterson, J. Quinn, & (The Microlensing Planet Search Collaboration.* 522, 1037 (1999)

Dust and Extinction Curves in Galaxies with $z > 0$: The Interstellar Medium of Gravitational Lens Galaxies. *E. E. Falco, C. D. Impey, C. S. Kochanek, J. Lehár, B. A. McLeod, H.-W. Rix, C. R. Keeton, J. A. Muñoz, & C. Y Peng.* 523, 617 (1999)

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Evolution of Bias in Different Cosmological Models. *Pedro Colín, Anatoly A. Klypin, Andrey V. Kravtsov, & Alexei M. Khokhlov.* 523, 32 (1999)

The Clustering of High-Redshift Galaxies in the Cold Dark Matter Scenario. *Neal Katz, Lars Hernquist, & David H. Weinberg.* 523, 463 (1999)

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Young Galaxies: What Turns Them On? *T. S. Kolatt, J. S. Bullock, R. S. Somerville, Y. Sigad, P. Jonsson, A. V. Kravtsov, A. A. Klypin, J. R. Primack, S. M. Faber, & A. Dekel.* 523, L109 (1999)

Abundances and Correlations of Structures beyond Galaxy Clusters. *Wen Xu, Li-Zhi Fang, & Zugan Deng.* 524, 1 (1999)

A Comparison of Simple Mass Estimators for Galaxy Clusters. *Tereasa G. Brainerd, Candace Oaxaca Wright, David M. Goldberg, & Jens Verner Villumsen.* 524, 9 (1999)

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The Fluctuations of the Cosmic Microwave Background for a Compact Hyperbolic Universe. *R. Aurich.* 524, 497 (1999)

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Schaefer, R. G. McMahon, R. O. Markze, E. Firth, P. Soffita, & L. Amati. 523, L121 (1999)

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The Velocity Dispersion of MS 1054−03: A Massive Galaxy Cluster at High Redshift. *Kim-Vy H. Tran, Daniel D. Kelson, Peter van Dokkum, Marijn Franx, Garth D. Illingworth, & Daniel Magee.* 522, 39 (1999)

An Extremely Luminous Galaxy at $z = 5.74$. *Esther M. Hu, Richard G. McMahon, & Lennox L. Cowie.* 522, L9 (1999)

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Closing In on Ω_M: The Amplitude of Mass Fluctuations from Galaxy Clusters and the Lyα Forest. *David H. Weinberg, Rupert A. C. Croft, Lars Hernquist, Neal Katz, & Max Pettini.* 522, 563 (1999)

Large-Scale Power Spectrum and Cosmological Parameters from SFI Peculiar Velocities. *Wolfram Freudling, Idit Zehavi, Luiz N. da Costa, Avishai Dekel, Amiram Eldar, Riccardo Giovanelli, Martha P. Haynes, John J. Salzer, Gary Wegner, & Saleem Zaroubi.* 523, 1 (1999)

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Power Spectrum Tomography with Weak Lensing. *Wayne Hu.* 522, L21 (1999)

Closing In on Ω_M: The Amplitude of Mass Fluctuations from Galaxy Clusters and the Lyα Forest. *David H. Weinberg, Rupert A. C. Croft, Lars Hernquist, Neal Katz, & Max Pettini.* 522, 563 (1999)

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Ω_B and Ω_0 from MACHOs and Local Group Dynamics. *G. Steigman & I. Tkachev.* 522, 793 (1999)

The Flatness of the Mass-to-Light Ratio on Large Scales. *Li-Zhi Fang & Wen Xu.* 522, L85 (1999)

Large-Scale Power Spectrum and Cosmological Parameters from SFI Peculiar Velocities. *Wolfram Freudling, Idit Zehavi, Luiz N. da Costa, Avishai Dekel, Amiram Eldar, Riccardo Giovanelli, Martha P. Haynes, John J. Salzer, Gary Wegner, & Saleem Zaroubi.* 523, 1 (1999)

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Modification of Weakly Nonlinear Mode Couplings Due to the Periodic Boundary Condition. *Naoki Seto.* 523, 24 (1999)

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Comparing Estimators of the Galaxy Correlation Function. *María-Jesús Pons-Bordería, Vicent J. Martínez, Dietrich Stoyan, Helga Stoyan, & Enn Saar.* 523, 480 (1999)

Distinguishing between Cold Dark Matter and Modified Newtonian Dynamics: Predictions for the Microwave Background. *Stacy S. McGaugh.* 523, L99 (1999)

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Abundances and Correlations of Structures beyond Galaxy Clusters. *Wen Xu, Li-Zhi Fang, & Zugan Deng.* 524, 1 (1999)

A Comparison of Simple Mass Estimators for Galaxy Clusters. *Tereasa G. Brainerd, Candace Oaxaca Wright, David M. Goldberg, & Jens Verner Villumsen.* 524, 9 (1999)

Dark Matter Substructure within Galactic Halos. *Ben Moore, Sebastiano Ghigna, Fabio Governato, George Lake, Thomas Quinn, Joachim Stadel, & Paolo Tozzi.* 524, L19 (1999)

The Fluctuations of the Cosmic Microwave Background for a Compact Hyperbolic Universe. *R. Aurich.* 524, 497 (1999)

An Upper Limit on Ω_m Using Lensed Arcs. *Asantha R. Cooray.* 524, 504 (1999)

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Comparison between Multisphere Light-scattering Calculations: Rigorous Solution and Discrete Dipole Approximation: Erratum. *Yu-lin Xu & Bo Å. S. Gustafson.* 522, 1206 (1999) (Orig. paper in 513, 894 (1999))

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A Novel Mechanism for the Formation of Electron-Positron Outflow from Hot Accretion Disks. *Tatsuya Yamasaki, Fumio Takahara, & Masaaki Kusunose.* 523, L21 (1999)

Detection of Circular Polarization in the Galactic Center Black Hole Candidate Sagittarius A*. *Geoffrey C. Bower, Heino Falcke, & Donald C. Backer.* 523, L29 (1999)

The X-Ray Spectra and Spectral Variability of Intermediate-Type Seyfert Galaxies: *ASCA* Observations of NGC 4388 and ESO 103−G35. *Karl Forster, Karen M. Leighly, & Laura E. Kay.* 523, 521 (1999)

Very Extended X-Ray and Hα Emission in M82: Implications for the Superwind Phenomenon. *Matthew D. Lehnert, Timothy M. Heckman, & Kimberly A. Weaver.* 523, 575 (1999)

The Broad Fe K-Line Profile in NGC 4151. *Jun-Xian Wang, You-Yuan Zhou, & Ting-Gui Wang.* 523, L129 (1999)

The Minor-Merger–driven Nuclear Activity in Seyfert Galaxies: A Step toward the Simple Unified Formation Mechanism of Active Galactic Nuclei in the Local Universe. *Yoshiaki Taniguchi.* 524, 65 (1999)

Modeling Variable Emission Lines in Active Galactic Nuclei: Method and Application to NGC 5548. *Shai Kaspi & Hagai Netzer.* 524, 71 (1999)

The *ASCA* Medium-Sensitivity Survey (The GIS Catalog Project): Source Counts and Evidence for Emerging Population of Hard Sources. *Yoshihiro Ueda, Tadayuki Takahashi, Yoshitaka Ishisaki, Takaya Ohashi, & Kazuo Makishima.* 524, L11 (1999)

On X-Ray Variability in Seyfert Galaxies. *T. J. Turner, I. M. George, K. Nandra, & D. Turcan.* 524, 667 (1999)

A Medium Survey of the Hard X-Ray Sky with *ASCA*. II. The Source's Broadband X-Ray Spectral Properties. *Roberto Della Ceca, GianMarco Castelli, Valentina Braito, Ilaria Cagnoni, & Tommaso Maccacaro.* 524, 674 (1999)

Neutral Hydrogen (21 Centimeter) Absorption in Seyfert Galaxies: Evidence for Free-Free Absorption and Subkiloparsec Gaseous Disks. *J. F. Gallimore, S. A. Baum, C. P. O'Dea, A. Pedlar, & E. Brinks.* 524, 684 (1999)

GALAXIES: BL LACERTAE OBJECTS: GENERAL

Optical Monitoring Sample of the GeV Gamma-Ray–loud Blazars. *G. Z. Xie, K. H. Li, X. Zhang, J. M. Bai, & W. W. Liu.* 522, 846 (1999)

GALAXIES: BL LACERTAE OBJECTS: INDIVIDUAL

Name: Markarian 501

TeV Cerenkov Events as Bose-Einstein Gamma Condensations. *Martin Harwit, R. J. Protheroe, & P. L. Biermann.* 524, L91 (1999)

Alphanumeric: PKS 2005−489

X-Ray Spectral Variability of PKS 2005−489 during the Spectacular 1998 November Flare. *Eric S. Perlman, Greg Madejski, John T. Stocke, & Travis A. Rector.* 523, L11 (1999)

GALAXIES: CLUSTERS: GENERAL

POTENT Reconstruction from Mark III Velocities. *A. Dekel, A. Eldar, T. Kolatt, A. Yahil, J. A. Willick, S. M. Faber, S. Courteau, & D. Burstein.* 522, 1 (1999)

Galaxy Cluster Shapes and Systematic Errors in H_0 Measured by the Sunyaev-Zeldovich Effect. *Martin E. Sulkanen.* 522, 59 (1999)

Where Are the Missing Galactic Satellites? *Anatoly Klypin, Andrey V. Kravtsov, Octavio Valenzuela, & Francisco Prada.* 522, 82 (1999)

The Fractal Distribution of Galaxies and the Transition to Homogeneity. *José Gaite, Alvaro Domínguez, & Juan Pérez-Mercader.* 522, L5 (1999)

The Las Campanas Observatory/Palomar 10,000 Kilometer per Second Cluster Survey. II. Constraints on Large-Scale Streaming. *Jeffrey A. Willick.* 522, 647 (1999)

Star Formation in Las Campanas Compact Groups. *Sahar S. Allam, Douglas L. Tucker, Huan Lin, & Yasuhiro Hashimoto.* 522, L89 (1999)

Large-Scale Power Spectrum and Cosmological Parameters from SFI Peculiar Velocities. *Wolfram Freudling, Idit Zehavi, Luiz N. da Costa, Avishai Dekel, Amiram Eldar, Riccardo Giovanelli, Martha P. Haynes, John J. Salzer, Gary Wegner, & Saleem Zaroubi.* 523, 1 (1999)

Eulerian Perturbative Approximations in Planar Symmetry. *A. P. Raposo, L. J. Goicoechea, & J. Buitrago.* 523, 16 (1999)

Inverse Compton Scattering in Mildly Relativistic Plasma. *S. M. Molnar & M. Birkinshaw.* 523, 78 (1999)

Radio Emission of Shakhbazian Compact Galaxy Groups. *H. M. Tovmassian, V. H. Chavushyan, O. V. Verkhodanov, & H. Tiersch.* 523, 87 (1999)

The Clustering of High-Redshift Galaxies in the Cold Dark Matter Scenario. *Neal Katz, Lars Hernquist, & David H. Weinberg.* 523, 463 (1999)

Comparing Estimators of the Galaxy Correlation Function. *María-Jesús Pons-Bordería, Vicent J. Martínez, Dietrich Stoyan, Helga Stoyan, & Enn Saar.* 523, 480 (1999)

Projection, Spatial Correlations, and Anisotropies in a Large and Complete Sample of Abell Clusters. *Christopher J. Miller, David J. Batuski, Kurt A. Slinglend, & John M. Hill.* 523, 492 (1999)

Ω_m from the Temperature-Redshift Distribution of EMSS Clusters of Galaxies. *Megan Donahue & G. Mark Voit.* 523, L137 (1999)

Abundances and Correlations of Structures beyond Galaxy Clusters. *Wen Xu, Li-Zhi Fang, & Zugan Deng.* 524, 1 (1999)

A Comparison of Simple Mass Estimators for Galaxy Clusters. *Tereasa G. Brainerd, Candace Oaxaca Wright, David M. Goldberg, & Jens Verner Villumsen.* 524, 9 (1999)

The L_X-T and L_X-σ Relationships for Galaxy Clusters Revisited. *Xiang-Ping Wu, Yan-Jie Xue, & Li-Zhi Fang.* 524, 22 (1999)

Dark Matter Substructure within Galactic Halos. *Ben Moore, Sebastiano Ghigna, Fabio Governato, George Lake, Thomas Quinn, Joachim Stadel, & Paolo Tozzi.* 524, L19 (1999)

Cluster Mass Function in Mixed Models. *A. Gardini, S. A. Bonometto, & G. Murante.* 524, 510 (1999)

GALAXIES: CLUSTERS: INDIVIDUAL

Name: Abell 115

Temperature Variation in the Cluster of Galaxies Abell 115 Studied with *ASCA*. *R. Shibata, H. Honda, M. Ishida, T. Ohashi, & K. Yamashita.* 524, 603 (1999)

Name: Centaurus

A Cepheid Distance to NGC 4603 in Centaurus. *Jeffrey A. Newman, Stephen E. Zepf, Marc Davis, Wendy L. Freedman, Barry F. Madore, Peter B. Stetson, N. Silbermann, & Randy Phelps.* 523, 506 (1999)

Name: Centaurus A

New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group. *G. D. Banks, M. J. Disney, P. M. Knezek, H. Jerjen, D. G. Barnes, R. Bhatal, W. J. G. de Blok, P. J. Boyce, R. D. Ekers, K. C. Freeman, B. K. Gibson, P. A. Henning, V. Kilborn, B. Koribalski, R. C. Kraan-Korteweg, D. F. Malin, R. F. Minchin, J. R. Mould, T. Oosterloo, R. M. Price, M. E. Putman, S. D. Ryder, E. M. Sadler, L. Staveley-Smith, I. Stewart, F. Stootman, R. A. Vaile, R. L. Webster, & A. E. Wright.* 524, 612 (1999)

Name: Virgo

Dark Mass–to–Luminous Mass Coupling in Virgo. *Edmond Giraud.* 524, L15 (1999)

Alphanumeric: A104

Galaxy Clustering and Large-Scale Structure from $z = 0.2$ to $z = 0.5$ in Two Norris Redshift Surveys. *Todd A. Small, Chung-Pei Ma, Wallace L. W. Sargent, & Donald Hamilton.* 524, 31 (1999)

Alphanumeric: MS 1054−03

The Velocity Dispersion of MS 1054−03: A Massive Galaxy Cluster at High Redshift. *Kim-Vy H. Tran, Daniel D. Kelson, Peter van Dokkum, Marijn Franx, Garth D. Illingworth, & Daniel Magee.* 522, 39 (1999)

GALAXIES: COMPACT

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GALAXIES: DISTANCES AND REDSHIFTS

POTENT Reconstruction from Mark III Velocities. *A. Dekel, A. Eldar, T. Kolatt, A. Yahil, J. A. Willick, S. M. Faber, S. Courteau, & D. Burstein.* 522, 1 (1999)

Geometric Distortion of the Correlation Function of Lyman-Break Galaxies. *Vibhat Nair.* 522, 569 (1999)

The Las Campanas Observatory/Palomar 10,000 Kilometer per Second Cluster Survey. II. Constraints on Large-Scale Streaming. *Jeffrey A. Willick.* 522, 647 (1999)

Large-Scale Power Spectrum and Cosmological Parameters from SFI Peculiar Velocities. *Wolfram Freudling, Idit Zehavi, Luiz N. da Costa, Avishai Dekel, Amiram Eldar, Riccardo Giovanelli, Martha P. Haynes, John J. Salzer, Gary Wegner, & Saleem Zaroubi.* 523, 1 (1999)

Projection, Spatial Correlations, and Anisotropies in a Large and Complete Sample of Abell Clusters. *Christopher J. Miller, David J. Batuski, Kurt A. Slinglend, & John M. Hill.* 523, 492 (1999)

A Cepheid Distance to NGC 4603 in Centaurus. *Jeffrey A. Newman, Stephen E. Zepf, Marc Davis, Wendy L. Freedman, Barry F. Madore, Peter B. Stetson, N. Silbermann, & Randy Phelps.* 523, 506 (1999)

The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319. *Shoko Sakai, Laura Ferrarese, Robert C. Kennicutt, John A. Graham, N. A. Silbermann, Jeremy R. Mould, Wendy L. Freedman, Fabio Bresolin, Holland C. Ford, Brad K. Gibson, Mingsheng Han, Paul Harding, John G. Hoessel, John P. Huchra, Shaun M. Hughes, Garth D. Illingworth, Daniel Kelson, Lucas Macri, Barry F. Madore, Randy L. Phelps, Abhijit Saha, Kim M. Sebo, Peter B. Stetson, & Anne Turner.* 523, 540 (1999)

Galaxy Clustering and Large-Scale Structure from $z = 0.2$ to $z = 0.5$ in Two Norris Redshift Surveys. *Todd A. Small, Chung-Pei Ma, Wallace L. W. Sargent, & Donald Hamilton.* 524, 31 (1999)

A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes. *K. Hurley, P. Li, M. Boer, T. Cline, G. J. Fishman, C. Meegan, C. Kouveliotou, J. Greiner, J. Laros, C. Luginbuhl, F. Vrba, T. Murakami, H. Pedersen, & J. van Paradijs.* 524, 92 (1999)

New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group. *G. D. Banks, M. J. Disney, P. M. Knezek, H. Jerjen, D. G. Barnes, R. Bhatal, W. J. G. de Blok, P. J. Boyce, R. D. Ekers, K. C. Freeman, B. K. Gibson, P. A. Henning, V. Kilborn, B. Koribalski, R. C. Kraan-Korteweg, D. F. Malin, R. F. Minchin, J. R. Mould, T. Oosterloo, R. M. Price, M. E. Putman, S. D. Ryder, E. M. Sadler, L. Staveley-Smith, I. Stewart, F. Stootman, R. A. Vaile, R. L. Webster, & A. E. Wright.* 524, 612 (1999)

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Projection, Spatial Correlations, and Anisotropies in a Large and Complete Sample of Abell Clusters. *Christopher J. Miller, David J. Batuski, Kurt A. Slinglend, & John M. Hill.* 523, 492 (1999)

A NICMOS Search for High-Redshift Elliptical Galaxy Candidates. *Tommaso Treu & Massimo Stiavelli.* 524, L27 (1999)

A Galaxy X-Ray Fundamental Plane? *M. Fukugita & P. J. E. Peebles.* 524, L31 (1999)

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The Taxonomy of Blue Amorphous Galaxies. II. Structure and Evolution. *Amanda T. Marlowe, Gerhardt R. Meurer, & Timothy M. Heckman.* 522, 183 (1999)

Dust-to-Gas Ratio and Metallicity in Dwarf Galaxies. *Hiroyuki Hirashita.* 522, 220 (1999)

An Extremely Luminous Galaxy at $z = 5.74$. *Esther M. Hu, Richard G. McMahon, & Lennox L. Cowie.* 522, L9 (1999)

A New Ultradense Group of Obscured Emission-Line Galaxies. *R. Weinberger, S. Temporin, & F. Kerber.* 522, L17 (1999)

A Semiempirical Model of the Infrared Universe. *Jonathan C. Tan, Joe Silk, & Christophe Balland.* 522, 579 (1999)

Cosmic Histories of Stars, Gas, Heavy Elements, and Dust in Galaxies. *Yichuan C. Pei, S. Michael Fall, & Michael G. Hauser.* 522, 604 (1999)

Luminosity Profiles of Merger Remnants. *J. E. Hibbard & Min S. Yun.* 522, L93 (1999)

A New Culprit in the Second-Parameter Problem in the Sculptor Dwarf Spheroidal Galaxy? *Denise Hurley-Keller, Mario Mateo, & Eva K. Grebel.* 523, L25 (1999)

The Centers of Early- to Intermediate-Type Spiral Galaxies: A Structural Analysis. *C. Marcella Carollo.* 523, 566 (1999)

On the Formation of Boxy and Disky Elliptical Galaxies. *Thorsten Naab, Adreas Burkert, & Lars Hernquist.* 523, L133 (1999)

A NICMOS Search for High-Redshift Elliptical Galaxy Candidates. *Tommaso Treu & Massimo Stiavelli.* 524, L27 (1999)

Temperature Variation in the Cluster of Galaxies Abell 115 Studied with *ASCA*. *R. Shibata, H. Honda, M. Ishida, T. Ohashi, & K. Yamashita.* 524, 603 (1999)

GALAXIES: FORMATION

POTENT Reconstruction from Mark III Velocities. *A. Dekel, A. Eldar, T. Kolatt, A. Yahil, J. A. Willick, S. M. Faber, S. Courteau, & D. Burstein.* 522, 1 (1999)

An Extremely Luminous Galaxy at $z = 5.74$. *Esther M. Hu, Richard G. McMahon, & Lennox L. Cowie.* 522, L9 (1999)

The Physical Origin of Scale-dependent Bias in Cosmological Simulations. *Michael Blanton, Renyue Cen, Jeremiah P. Ostriker, & Michael A. Strauss.* 522, 590 (1999)

The Photoevaporation of Dwarf Galaxies during Reionization. *Rennan Barkana & Abraham Loeb.* 523, 54 (1999)

Photon-conserving Radiative Transfer around Point Sources in Multidimensional Numerical Cosmology. *Tom Abel, Michael L. Norman, & Piero Madau.* 523, 66 (1999)

The Centers of Early- to Intermediate-Type Spiral Galaxies: A Structural Analysis. *C. Marcella Carollo.* 523, 566 (1999)

Formation and Disruption of Cosmolgical Low-Mass Objects. *Ryoichi Nishi & Hajime Susa.* 523, L103 (1999)

Dark Matter Substructure within Galactic Halos. *Ben Moore, Sebastiano Ghigna, Fabio Governato, George Lake, Thomas Quinn, Joachim Stadel, & Paolo Tozzi.* 524, L19 (1999)

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A NICMOS Search for High-Redshift Elliptical Galaxy Candidates. *Tommaso Treu & Massimo Stiavelli.* 524, L27 (1999)

Constrained Violent Relaxation to a Spherical Halo. *A. Mangalam, R. Nityananda, & S. Sridhar.* 524, 623 (1999)

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Stochastic Biasing and Galaxy–Mass Density Relation in the Weakly Nonlinear Regime. *Atsushi Taruya & Jiro Soda.* 522, 46 (1999)

Bar Diagnostics in Edge-on Spiral Galaxies. I. The Periodic Orbits Approach. *M. Bureau & E. Athanassoula.* 522, 686 (1999)

Bar Diagnostics in Edge-on Spiral Galaxies. II. Hydrodynamical Simulations. *E. Athanassoula & M. Bureau.* 522, 699 (1999)

The Flatness of the Mass-to-Light Ratio on Large Scales. *Li-Zhi Fang & Wen Xu.* 522, L85 (1999)

The Influence of Bulge Profile Shapes on Claims for a Scale-free Hubble Sequence for Spiral Galaxies. *Alister W. Graham & Mercedes Prieto.* 524, L23 (1999)

The Proper Motion of Sagittarius A*. I. First VLBA Results. *M. J. Reid, A. C. S. Readhead, R. C. Vermeulen, & R. N. Treuhaft.* 524, 816 (1999)

GALAXIES: GENERAL

Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array. *M. Takeda, N. Hayashida, K. Honda, N. Inoue, K. Kadota, F. Kakimoto, K. Kamata, S. Kawaguchi, Y. Kawasaki, N. Kawasumi, E. Kusano, Y. Matsubara, K. Murakami, M. Nagano, D. Nishikawa, H. Ohoka, S. Osone, N. Sakaki, M. Sasaki, K. Shinozaki, N. Souma, M. Teshima, R. Torii, I. Tsushima, Y. Uchihori, T. Yamamoto, S. Yoshida, & H. Yoshii.* 522, 225 (1999)

GALAXIES: HALOS

Dyanamics in a Lopsided Spiral Galaxy: Negative Disk Response to Perturbation Halo Potential. *Chanda J. Jog.* 522, 661 (1999)

Diffuse Ionized Gas in Edge-on Spiral Galaxies: Extraplanar and Outer Disk Hα Emission. *Charles G. Hoopes, René A. M. Walterbos, & Richard J. Rand.* 522, 669 (1999)

Evolution of Bias in Different Cosmological Models. *Pedro Colín, Anatoly A. Klypin, Andrey V. Kravtsov, & Alexei M. Khokhlov.* 523, 32 (1999)

The Photoevaporation of Dwarf Galaxies during Reionization. *Rennan Barkana & Abraham Loeb.* 523, 54 (1999)

An *Infrared Space Observatory* Upper Limit to the Low-Mass Star Halo in the Edge-on Galaxy NGC 4565. *Charles Beichman, George Helou, Dave Van Buren, Ken Ganga, & F. X. Desert.* 523, 559 (1999)

A Study of Lyα Quasar Absorbers in the Nearby Universe. *C. D. Impey, C. E. Petry, & K. P. Flint.* 524, 536 (1999)

Constrained Violent Relaxation to a Spherical Halo. *A. Mangalam, R. Nityananda, & S. Sridhar.* 524, 623 (1999)

The Very Extended Ionized Nebula around the Quasar MR 2251−178. *P. L. Shopbell, S. Veilleux, & J. Bland-Hawthorn.* 524, L83 (1999)

GALAXIES: INDIVIDUAL

Messier Number: M31

The Double Nucleus and Central Black Hole of M31. *John Kormendy & Ralf Bender.* 522, 772 (1999)

On the Nuclear Rotation Curve of M31. *Thomas S. Statler.* 524, L87 (1999)

Messier Number: M51

A New High-Resolution CO Map of the Inner 2.5 Arcminutes of M51. I. Streaming Motions and Spiral Structure. *S. Aalto, S. Hüttemeister, N. Z. Scoville, & P. Thaddeus.* 522, 165 (1999)

Messier Number: M82

Very Extended X-Ray and Hα Emission in M82: Implications for the Superwind Phenomenon. *Matthew D. Lehnert, Timothy M. Heckman, & Kimberly A. Weaver.* 523, 575 (1999)

Messier Number: M84

M84: A Warp Caused by Jet-induced Pressure Gradients? *A. C. Quillen & Gary A. Bower.* 522, 718 (1999)

Messier Number: M87

Dark Mass–to–Luminous Mass Coupling in Virgo. *Edmond Giraud.* 524, L15 (1999)

Messier Number: M101

Star Formation in the Giant H II Regions of M101. *Jean Giannakopoulou-Creighton, Michel Fich, & Christine D. Wilson.* 522, 238 (1999)

An Ultradeep High-Resolution X-Ray Image of M101: The X-Ray Source Population in a Late-Type Spiral. *Q. Daniel Wang, Stefan Immler, & Wolfgang Pietsch.* 523, 121 (1999)

NGC Number: NGC 891

First Extragalactic Direct Detection of Large-Scale Molecular Hydrogen in the Disk of NGC 891. *Edwin A. Valentijn & Paul P. van der Werf.* 522, L29 (1999)

NGC Number: NGC 1068

The Molecular Gas in the Circumnuclear Region of Seyfert Galaxies. *E. Schinnerer, A. Eckart, & L. J. Tacconi.* 524, L5 (1999)

NGC Number: NGC 2110

Hubble Space Telescope/Faint Object Spectrograph Spectroscopy of Spatially Resolved Narrow-Line Regions in the Seyfert 2 Galaxies NGC 2110 and NGC 5929. *Pierre Ferruit, Andrew S. Wilson, Mark Whittle, Chris Simpson, John S. Mulcahey, & Gary J. Ferland.* 523, 147 (1999)

NGC Number: NGC 3227

The Molecular Gas in the Circumnuclear Region of Seyfert Galaxies. *E. Schinnerer, A. Eckart, & L. J. Tacconi.* 524, L5 (1999)

NGC Number: NGC 3319

The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319. *Shoko Sakai, Laura Ferrarese, Robert C. Kennicutt, John A. Graham, N. A. Silbermann, Jeremy R. Mould, Wendy L. Freedman, Fabio Bresolin, Holland C. Ford, Brad K. Gibson, Mingsheng Han, Paul Harding, John G. Hoessel, John P. Huchra, Shaun M. Hughes, Garth D. Illingworth, Daniel Kelson, Lucas Macri, Barry F. Madore, Randy L. Phelps, Abhijit Saha, Kim M. Sebo, Peter B. Stetson, & Anne Turner.* 523, 540 (1999)

NGC Number: NGC 3516

The Properties of the Relativistic Iron K-Line in NGC 3516. *K. Nandra, I. M. George, R. F. Mushotzky, T. J. Turner, & T. Yaqoob.* 523, L17 (1999)

NGC 3516: The Long-Term Variability of the Active Galactic Nucleus Emission-Line and Absorption-Line Regions. *M. R. Goad, A. P. Koratkar, J. Kim-Quijano, K. T. Korista, P. T. O'Brien, & D. J. Axon.* 524, 707 (1999)

NGC Number: NGC 3627

Cepheid Calibration of the Peak Brightness of Type Ia Supernovae. IX. SN 1989B in NGC 3627. *A. Saha, Allan Sandage, G. A. Tammann, Lukas Labhardt, F. D. Macchetto, & N. Panagia.* 522, 802 (1999)

NGC Number: NGC 3921

Luminosity Profiles of Merger Remnants. *J. E. Hibbard & Min S. Yun.* 522, L93 (1999)

NGC Number: NGC 4051

A Multicloud Warm-Absorber Model for NGC 4051. *M. Contini & S. M. Viegas.* 523, 114 (1999)

NGC Number: NGC 4151

The Broad Fe K-Line Profile in NGC 4151. *Jun-Xian Wang, You-Yuan Zhou, & Ting-Gui Wang.* 523, L129 (1999)

NGC Number: NGC 4527

Evolution of the Light Echo of SN 1991T. *W. B. Sparks, F. Macchetto, N. Panagia, F. R. Boffi, D. Branch, M. L. Hazen, & M. Della Valle.* 523, 585 (1999)

NGC Number: NGC 4565

An *Infrared Space Observatory* Upper Limit to the Low-Mass Star Halo in the Edge-on Galaxy NGC 4565. *Charles Beichman, George Helou, Dave Van Buren, Ken Ganga, & F. X. Desert.* 523, 559 (1999)

NGC Number: NGC 4603

A Cepheid Distance to NGC 4603 in Centaurus. *Jeffrey A. Newman, Stephen E. Zepf, Marc Davis, Wendy L. Freedman, Barry F. Madore, Peter B. Stetson, N. Silbermann, & Randy Phelps.* 523, 506 (1999)

NGC Number: NGC 5548

Modeling Variable Emission Lines in Active Galactic Nuclei: Method and Application to NGC 5548. *Shai Kaspi & Hagai Netzer.* 524, 71 (1999)

NGC Number: NGC 5929

Hubble Space Telescope/Faint Object Spectrograph Spectroscopy of Spatially Resolved Narrow-Line Regions in the Seyfert 2 Galaxies NGC 2110 and NGC 5929. *Pierre Ferruit, Andrew S. Wilson, Mark Whittle, Chris Simpson, John S. Mulcahey, & Gary J. Ferland.* 523, 147 (1999)

NGC Number: NCC 6240

Gasdynamics in the Luminous Merger NCG 6240. *L. J. Tacconi, R. Genzel, M. Tecza, J. F. Gallimore, D. Downes, & N. Z. Scoville.* 524, 732 (1999)

NGC Number: NGC 6300

An *RXTE* Observation of NGC 6300: A New Bright Compton Reflection–dominated Seyfert 2 Galaxy. *Karen M. Leighly, Jules Halpern, Hisamitsu Awaki, Massimo Cappi, Shiro Ueno, & Joachim Siebert.* 522, 209 (1999)

NGC Number: NGC 6393

An *RXTE* Observation of NGC 6300: A New Bright Compton Reflection–dominated Seyfert 2 Galaxy. *Karen M. Leighly, Jules Halpern, Hisamitsu Awaki, Massimo Cappi, Shiro Ueno, & Joachim Siebert.* 522, 209 (1999)

NGC Number: NGC 7252

Luminosity Profiles of Merger Remnants. *J. E. Hibbard & Min S. Yun.* 522, L93 (1999)

NGC Number: NGC 7673

Kinematics and Structure of the Starburst Galaxy NGC 7673. *N. L. Homeier & J. S. Gallagher.* 522, 199 (1999)

Name: Arp 220

Luminosity Profiles of Merger Remnants. *J. E. Hibbard & Min S. Yun.* 522, L93 (1999)

Name: Markarian 273

The Nature of the Diffuse Clumps and the X-Ray Companion of Markarian 273. *X.-Y. Xia, S. Mao, H. Wu, X.-W. Liu, Y. Gao, Z.-G. Deng, & Z.-L. Zou.* 524, 746 (1999)

Name: Sculptor Dwarf

A New Culprit in the Second-Parameter Problem in the Sculptor Dwarf Spheroidal Galaxy? *Denise Hurley-Keller, Mario Mateo, & Eva K. Grebel.* 523, L25 (1999)

Alphanumeric: B2 1144+35

B2 1144+35: A Giant Low-Power Radio Galaxy with Superluminal Motion. *G. Giovannini, G. B. Taylor, E. Arbizzani, M. Bondi, W. D. Cotton, L. Feretti, L. Lara, & T. Venturi.* 522, 101 (1999)

Alphanumeric: ESO 141-055

GHRS and *ORFEUS II* Observations of the Highly Ionized Interstellar Medium toward ESO 141−055. *Kenneth R. Sembach, Blair D. Savage, & Mark Hurwitz.* 524, 98 (1999)

GALAXIES: INTERACTIONS

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^{13}CO J = 1–0 Depression in Luminous Starburst Mergers, Revisited. *Yoshiaki Taniguchi, Youichi Ohyama, & D. B. Sanders.* 522, 214 (1999)

A New Ultradense Group of Obscured Emission-Line Galaxies. *R. Weinberger, S. Temporin, & F. Kerber.* 522, L17 (1999)

Star Formation in Las Campanas Compact Groups. *Sahar S. Allam, Douglas L. Tucker, Huan Lin, & Yasuhiro Hashimoto.* 522, L89 (1999)

Luminosity Profiles of Merger Remnants. *J. E. Hibbard & Min S. Yun.* 522, L93 (1999)

Young Galaxies: What Turns Them On? *T. S. Kolatt, J. S. Bullock, R. S. Somerville, Y. Sigad, P. Jonsson, A. V. Kravtsov, A. A. Klypin, J. R. Primack, S. M. Faber, & A. Dekel.* 523, L109 (1999)

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The Minor-Merger–driven Nuclear Activity in Seyfert Galaxies: A Step toward the Simple Unified Formation Mechanism of Active Galactic Nuclei in the Local Universe. *Yoshiaki Taniguchi.* 524, 65 (1999)

Constrained Violent Relaxation to a Spherical Halo. *A. Mangalam, R. Nityananda, & S. Sridhar.* 524, 623 (1999)

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Hubble Space Telescope Faint Object Spectrograph Observations of a Unique Grouping of Five QSOs: The Sizes and Shapes of Low-z Lyα Forest Absorbers. *Eric M. Monier, David A. Turnshek, & Cyril Hazard.* 522, 627 (1999)

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A Study of Lyα Quasar Absorbers in the Nearby Universe. *C. D. Impey, C. E. Petry, & K. P. Flint.* 524, 536 (1999)

The Very Extended Ionized Nebula around the Quasar MR 2251−178. *P. L. Shopbell, S. Veilleux, & J. Bland-Hawthorn.* 524, L83 (1999)

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Kinematics and Structure of the Starburst Galaxy NGC 7673. *N. L. Homeier & J. S. Gallagher.* 522, 199 (1999)

^{13}CO J = 1–0 Depression in Luminous Starburst Mergers, Revisited. *Yoshiaki Taniguchi, Youichi Ohyama, & D. B. Sanders.* 522, 214 (1999)

Dust-to-Gas Ratio and Metallicity in Dwarf Galaxies. *Hiroyuki Hirashita.* 522, 220 (1999)

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Cosmic Histories of Stars, Gas, Heavy Elements, and Dust in Galaxies. *Yichuan C. Pei, S. Michael Fall, & Michael G. Hauser.* 522, 604 (1999)

Diffuse Ionized Gas in Edge-on Spiral Galaxies: Extraplanar and Outer Disk Hα Emission. *Charles G. Hoopes, René A. M. Walterbos, & Richard J. Rand.* 522, 669 (1999)

Bar Diagnostics in Edge-on Spiral Galaxies. I. The Periodic Orbits Approach. *M. Bureau & E. Athanassoula.* 522, 686 (1999)

M84: A Warp Caused by Jet-induced Pressure Gradients? *A. C. Quillen & Gary A. Bower.* 522, 718 (1999)

Chemical Abundance Gradients in the Star-forming Ring Galaxies. *Vladimir Korchagin, Eduard Vorobyov, & Y. D. Mayya.* 522, 767 (1999)

Photon-conserving Radiative Transfer around Point Sources in Multidimensional Numerical Cosmology. *Tom Abel, Michael L. Norman, & Piero Madau.* 523, 66 (1999)

The Gaseous Extent of Galaxies and the Origin of Lyα Absorption Systems. IV. Lyα Absorbers Arising in a Galaxy Group. *A. Ortiz-Gill, K. M. Lanzetta, J. K. Webb, X. Barcons, & A. Fernández-Soto.* 523, 72 (1999)

Age and Dust Degeneracy for Starburst Galaxies Solved? *Toshinobu Takagi, Nobuo Arimoto, & Vladas Vansevičius.* 523, 107 (1999)

A Multicloud Warm-Absorber Model for NGC 4051. *M. Contini & S. M. Viegas.* 523, 114 (1999)

An Ultradeep High-Resolution X-Ray Image of M101: The X-Ray Source Population in a Late-Type Spiral. *Q. Daniel Wang, Stefan Immler, & Wolfgang Pietsch.* 523, 121 (1999)

Very Extended X-Ray and Hα Emission in M82: Implications for the Superwind Phenomenon. *Matthew D. Lehnert, Timothy M. Heckman, & Kimberly A. Weaver.* 523, 575 (1999)

Dust and Extinction Curves in Galaxies with $z > 0$: The Interstellar Medium of Gravitational Lens Galaxies. *E. E. Falco, C. D. Impey, C. S. Kochanek, J. Lehár, B. A. McLeod, H.-W. Rix, C. R. Keeton, J. A. Muñoz, & C. Y Peng.* 523, 617 (1999)

The Molecular Gas in the Circumnuclear Region of Seyfert Galaxies. *E. Schinnerer, A. Eckart, & L. J. Tacconi.* 524, L5 (1999)

New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group. *G. D. Banks, M. J. Disney, P. M. Knezek, H. Jerjen, D. G. Barnes, R. Bhatal, W. J. G. de Blok, P. J. Boyce, R. D. Ekers, K. C. Freeman, B. K. Gibson, P. A. Henning, V. Kilborn, B. Koribalski, R. C. Kraan-Korteweg, D. F. Malin, R. F. Minchin, J. R. Mould, T. Oosterloo, R. M. Price, M. E. Putman, S. D. Ryder, E. M. Sadler, L. Staveley-Smith, I. Stewart, F. Stootman, R. A. Vaile, R. L. Webster, & A. E. Wright.* 524, 612 (1999)

Neutral Hydrogen (21 Centimeter) Absorption in Seyfert Galaxies: Evidence for Free-Free Absorption and Subkiloparsec Gaseous Disks. *J. F. Gallimore, S. A. Baum, C. P. O'Dea, A. Pedlar, & E. Brinks.* 524, 684 (1999)

Gasdynamics in the Luminous Merger NCG 6240. *L. J. Tacconi, R. Genzel, M. Tecza, J. F. Gallimore, D. Downes, & N. Z. Scoville.* 524, 732 (1999)

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Outburst in the Polarized Structure of the Compact Jet of 3C 454.3. *José-Louis Gómez, Alan P. Marscher, & Antonio Alberdi.* 522, 74 (1999)

Transient Emission from Dissipative Fronts in Magnetized, Relativistic Outflows. II. Synchrotron Flares. *Amir Levinson.* 522, 93 (1999)

B2 1144+35: A Giant Low-Power Radio Galaxy with Superluminal Motion. *G. Giovannini, G. B. Taylor, E. Arbizzani, M. Bondi, W. D. Cotton, L. Feretti, L. Lara, & T. Venturi.* 522, 101 (1999)

M84: A Warp Caused by Jet-induced Pressure Gradients? *A. C. Quillen & Gary A. Bower.* 522, 718 (1999)

Relativistic Jet Formation from Black Hole Magnetized Accretion Disks: Method, Tests, and Applications of a General Relativistic Magnetohydrodynamic Numerical Code. *Shinji Koide, Kazunari Shibata, & Takahiro Kudoh.* 522, 727 (1999)

A Magnetically Switched, Rotating Black Hole Model for the Production of Extragalactic Radio Jets and the Fanaroff and Riley Class Division. *D. L. Meier.* 522, 753 (1999)

Hubble Space Telescope/Faint Object Spectrograph Spectroscopy of Spatially Resolved Narrow-Line Regions in the Seyfert 2 Galaxies NGC 2110 and NGC 5929. *Pierre Ferruit, Andrew S. Wilson, Mark Whittle, Chris Simpson, John S. Mulcahey, & Gary J. Ferland.* 523, 147 (1999)

A Novel Mechanism for the Formation of Electron-Positron Outflow from Hot Accretion Disks. *Tatsuya Yamasaki, Fumio Takahara, & Masaaki Kusunose.* 523, L21 (1999)

High-Resolution Three-dimensional Simulations of Relativistic Jets. *M. A. Aloy, J. M. Ibáñez, J. M. Martí, J.-L. Gómez, & E. Müller.* 523, L125 (1999)

On the Dynamics and Structure of Three-dimensional Trans-Alfvénic Jets. *Philip E. Hardee & Alexander Rosen.* 524, 650 (1999)

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A New High-Resolution CO Map of the Inner 2.5 Arcminutes of M51. I. Streaming Motions and Spiral Structure. *S. Aalto, S. Hüttemeister, N. Z. Scoville, & P. Thaddeus.* 522, 165 (1999)

Kinematics and Structure of the Starburst Galaxy NGC 7673. *N. L. Homeier & J. S. Gallagher.* 522, 199 (1999)

Deceleration by Dynamical Friction in a Gaseous Medium. *F. J. Sánchez-Salcedo & A. Brandenberg.* 522, L35 (1999)

Dyanamics in a Lopsided Spiral Galaxy: Negative Disk Response to Perturbation Halo Potential. *Chanda J. Jog.* 522, 661 (1999)

Bar Diagnostics in Edge-on Spiral Galaxies. I. The Periodic Orbits Approach. *M. Bureau & E. Athanassoula.* 522, 686 (1999)

Bar Diagnostics in Edge-on Spiral Galaxies. II. Hydrodynamical Simulations. *E. Athanassoula & M. Bureau.* 522, 699 (1999)

The Double Nucleus and Central Black Hole of M31. *John Kormendy & Ralf Bender.* 522, 772 (1999)

Emergent Spectra from Slim Accretion Disks in Active Galactic Nuclei. *Jian-Min Wang, Ewa Szuszkiewicz, Fang-Jun Lu, & You-Yuan Zhou.* 522, 839 (1999)

Central Rotation Curves of Spiral Galaxies. *Y. Sofue, Y. Tutui, M. Honma, A. Tomita, T. Takamiya, J. Koda, & Y. Takeda.* 523, 136 (1999)

Constrained Violent Relaxation to a Spherical Halo. *A. Mangalam, R. Nityananda, & S. Sridhar.* 524, 623 (1999)

Eccentric Behavior of Disk Galaxies. *R. V. E. Lovelace, L. Zhang, D. A. Kornreich, & M. P. Haynes.* 524, 634 (1999)

Gasdynamics in the Luminous Merger NCG 6240. *L. J. Tacconi, R. Genzel, M. Tecza, J. F. Gallimore, D. Downes, & N. Z. Scoville.* 524, 732 (1999)

On the Nuclear Rotation Curve of M31. *Thomas S. Statler.* 524, L87 (1999)

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Ω_B and Ω_0 from MACHOs and Local Group Dynamics. *G. Steigman & I. Tkachev.* 522, 793 (1999)

Superbubble Evolution Including the Star-forming Clouds: Is It Possible to Reconcile Large Magellanic Cloud Observations with Model Predictions? *Sergei Silich & José Franco.* 522, 863 (1999)

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The Distribution of Absorbing Column Densities among Seyfert 2 Galaxies. *G. Risaliti, R. Maiolino, & M. Salvati.* 522, 157 (1999)

The Double Nucleus and Central Black Hole of M31. *John Kormendy & Ralf Bender.* 522, 772 (1999)

Central Rotation Curves of Spiral Galaxies. *Y. Sofue, Y. Tutui, M. Honma, A. Tomita, T. Takamiya, J. Koda, & Y. Takeda.* 523, 136 (1999)

The Blandford-Znajek Mechanism and the Emission from Isolated Accreting Black Holes. *Philip J. Armitage & Priyamvada Natarjan.* 523, L7 (1999)

The Properties of the Relativistic Iron K-Line in NGC 3516. *K. Nandra, I. M. George, R. F. Mushotzky, T. J. Turner, & T. Yaqoob.* 523, L17 (1999)

Very Extended X-Ray and Hα Emission in M82: Implications for the Superwind Phenomenon. *Matthew D. Lehnert, Timothy M. Heckman, & Kimberly A. Weaver.* 523, 575 (1999)

The Minor-Merger–driven Nuclear Activity in Seyfert Galaxies: A Step toward the Simple Unified Formation Mechanism of Active Galactic Nuclei in the Local Universe. *Yoshiaki Taniguchi.* 524, 65 (1999)

Modeling Variable Emission Lines in Active Galactic Nuclei: Method and Application to NGC 5548. *Shai Kaspi & Hagai Netzer.* 524, 71 (1999)

The Molecular Gas in the Circumnuclear Region of Seyfert Galaxies. *E. Schinnerer, A. Eckart, & L. J. Tacconi.* 524, L5 (1999)

On X-Ray Variability in Seyfert Galaxies. *T. J. Turner, I. M. George, K. Nandra, & D. Turcan.* 524, 667 (1999)

On the Nuclear Rotation Curve of M31. *Thomas S. Statler.* 524, L87 (1999)

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Evolution of the Light Echo of SN 1991T. *W. B. Sparks, F. Macchetto, N. Panagia, F. R. Boffi, D. Branch, M. L. Hazen, & M. Della Valle.* 523, 585 (1999)

A Photometric Investigation of the GRB 970228 Afterglow and the Associated Nebulosity. *Francisco J. Castander & Donald Q. Lamb.* 523, 593 (1999)

Dust and Extinction Curves in Galaxies with $z > 0$: The Interstellar Medium of Gravitational Lens Galaxies. *E. E. Falco, C. D. Impey, C. S. Kochanek, J. Lehár, B. A. McLeod, H.-W. Rix, C. R. Keeton, J. A. Muñoz, & C. Y Peng.* 523, 617 (1999)

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The Gaseous Extent of Galaxies and the Origin of Lyα Absorption Systems. IV. Lyα Absorbers Arising in a Galaxy Group. *A. Ortiz-Gill, K. M. Lanzetta, J. K. Webb, X. Barcons, & A. Fernández-Soto.* 523, 72 (1999)

Ionized Gas in Damped Lyα Systems and Its Effects on Elemental Abundance Studies. *J. Christopher Howk & Kenneth R. Sembach.* 523, L141 (1999)

A Study of Lyα Quasar Absorbers in the Nearby Universe. *C. D. Impey, C. E. Petry, & K. P. Flint.* 524, 536 (1999)

What Determines the Depth of Broad Absorption Lines? Keck HIRES Observations of BALQSO 1603+3002. *Nahum Arav, Robert H. Becker, Sally A. Laurent-Muehleisen, Michael D. Gregg, Richard L. White, Michael S. Brotherton, & Martijn de Kool.* 524, 566 (1999)

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Hubble Space Telescope Faint Object Spectrograph Observations of a Unique Grouping of Five QSOs: The Sizes and Shapes of Low-z Lyα Forest Absorbers. *Eric M. Monier, David A. Turnshek, & Cyril Hazard.* 522, 627 (1999)

The Minor-Merger–driven Nuclear Activity in Seyfert Galaxies: A Step toward the Simple Unified Formation Mechanism of Active Galactic Nuclei in the Local Universe. *Yoshiaki Taniguchi.* 524, 65 (1999)

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Alphanumeric: 3C 454.3

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The X-Ray Spectra and Spectral Variability of Intermediate-Type Seyfert Galaxies: *ASCA* Observations of NGC 4388 and ESO 103−G35. *Karl Forster, Karen M. Leighly, & Laura E. Kay.* 523, 521 (1999)

Alphanumeric: MR 2251−178

The Very Extended Ionized Nebula around the Quasar MR 2251−178. *P. L. Shopbell, S. Veilleux, & J. Bland-Hawthorn.* 524, L83 (1999)

Alphanumeric: NGC 4388

The X-Ray Spectra and Spectral Variability of Intermediate-Type Seyfert Galaxies: *ASCA* Observations of NGC 4388 and ESO 103−G35. *Karl Forster, Karen M. Leighly, & Laura E. Kay.* 523, 521 (1999)

Alphanumeric: Q0957+561

New Modeling of the Lensing Galaxy and Cluster of Q0957+561: Implications for the Global Value of the Hubble Constant. *Kyu-Hyun Chae.* 524, 582 (1999)

Alphanumeric: Q1634+267

The Quasar Pair Q1634+267A,B and the Binary QSO versus Dark Lens Hypotheses. *C. Y. Peng, C. D. Impey, E. E. Falco, C. S. Kochanek, J. Lehár, B. A. McLeod, H.-W. Rix, C. R. Keeton, & J. A. Muñoz.* 524, 572 (1999)

Alphanumeric: QSO 1545+2101

The Gaseous Extent of Galaxies and the Origin of Lyα Absorption Systems. IV. Lyα Absorbers Arising in a Galaxy Group. *A. Ortiz-Gill, K. M. Lanzetta, J. K. Webb, X. Barcons, & A. Fernández-Soto.* 523, 72 (1999)

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Optical Spectroscopy of the *IRAS* 1 Jy Sample of Ultraluminous Infrared Galaxies. *Sylvain Veilleux, D.-C. Kim, & D. B. Sanders.* 522, 113 (1999)

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The Distribution of Absorbing Column Densities among Seyfert 2 Galaxies. *G. Risaliti, R. Maiolino, & M. Salvati.* 522, 157 (1999)

An *RXTE* Observation of NGC 6300: A New Bright Compton Reflection–dominated Seyfert 2 Galaxy. *Karen M. Leighly, Jules Halpern, Hisamitsu Awaki, Massimo Cappi, Shiro Ueno, & Joachim Siebert.* 522, 209 (1999)

A Multicloud Warm-Absorber Model for NGC 4051. *M. Contini & S. M. Viegas.* 523, 114 (1999)

Hubble Space Telescope/Faint Object Spectrograph Spectroscopy of Spatially Resolved Narrow-Line Regions in the Seyfert 2 Galaxies NGC 2110 and NGC 5929. *Pierre Ferruit, Andrew S. Wilson, Mark Whittle, Chris Simpson, John S. Mulchaey, & Gary J. Ferland.* 523, 147 (1999)

The X-Ray Spectra and Spectral Variability of Intermediate-Type Seyfert Galaxies: *ASCA* Observations of NGC 4388 and ESO 103−G35. *Karl Forster, Karen M. Leighly, & Laura E. Kay.* 523, 521 (1999)

The Minor-Merger–driven Nuclear Activity in Seyfert Galaxies: A Step toward the Simple Unified Formation Mechanism of Active Galactic Nuclei in the Local Universe. *Yoshiaki Taniguchi.* 524, 65 (1999)

Modeling Variable Emission Lines in Active Galactic Nuclei: Method and Application to NGC 5548. *Shai Kaspi & Hagai Netzer.* 524, 71 (1999)

The Molecular Gas in the Circumnuclear Region of Seyfert Galaxies. *E. Schinnerer, A. Eckart, & L. J. Tacconi.* 524, L5 (1999)

On X-Ray Variability in Seyfert Galaxies. *T. J. Turner, I. M. George, K. Nandra, & D. Turcan.* 524, 667 (1999)

A Medium Survey of the Hard X-Ray Sky with *ASCA*. II. The Source's Broadband X-Ray Spectral Properties. *Roberto Della Ceca, GianMarco Castelli, Valentina Braito, Ilaria Cagnoni, & Tommaso Maccacaro.* 524, 674 (1999)

Neutral Hydrogen (21 Centimeter) Absorption in Seyfert Galaxies: Evidence for Free-Free Absorption and Subkiloparsec Gaseous Disks. *J. F. Gallimore, S. A. Baum, C. P. O'Dea, A. Pedlar, & E. Brinks.* 524, 684 (1999)

NGC 3516: The Long-Term Variability of the Active Galactic Nucleus Emission-Line and Absorption-Line Regions. *M. R. Goad, A. P. Koratkar, J. Kim-Quijano, K. T. Korista, P. T. O'Brien, & D. J. Axon.* 524, 707 (1999)

The Nature of the Diffuse Clumps and the X-Ray Companion of Markarian 273. *X.-Y. Xia, S. Mao, H. Wu, X.-W. Liu, Y. Gao, Z.-G. Deng, & Z.-L. Zou.* 524, 746 (1999)

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Dust-to-Gas Ratio and Metallicity in Dwarf Galaxies. *Hiroyuki Hirashita.* 522, 220 (1999)

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Diffuse Ionized Gas in Edge-on Spiral Galaxies: Extraplanar and Outer Disk Hα Emission. *Charles G. Hoopes, René A. M. Walterbos, & Richard J. Rand.* 522, 669 (1999)

Bar Diagnostics in Edge-on Spiral Galaxies. I. The Periodic Orbits Approach. *M. Bureau & E. Athanassoula.* 522, 686 (1999)

Bar Diagnostics in Edge-on Spiral Galaxies. II. Hydrodynamical Simulations. *E. Athanassoula & M. Bureau.* 522, 699 (1999)

An Ultradeep High-Resolution X-Ray Image of M101: The X-Ray Source Population in a Late-Type Spiral. *Q. Daniel Wang, Stefan Immler, & Wolfgang Pietsch.* 523, 121 (1999)

Central Rotation Curves of Spiral Galaxies. *Y. Sofue, Y. Tutui, M. Honma, A. Tomita, T. Takamiya, J. Koda, & Y. Takeda.* 523, 136 (1999)

The Influence of Bulge Profile Shapes on Claims for a Scale-free Hubble Sequence for Spiral Galaxies. *Alister W. Graham & Mercedes Prieto.* 524, L23 (1999)

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Optical Spectroscopy of the *IRAS* 1 Jy Sample of Ultraluminous Infrared Galaxies. *Sylvain Veilleux, D.-C. Kim, & D. B. Sanders.* 522, 113 (1999)

New Results from a Near-Infrared Search for Hidden Broad-Line Regions in Ultraluminous Infrared Galaxies. *Sylvain Veilleux, D. B. Sanders, & D.-C. Kim.* 522, 139 (1999)

The Taxonomy of Blue Amorphous Galaxies. II. Structure and Evolution. *Amanda T. Marlowe, Gerhardt R. Meurer, & Timothy M. Heckman.* 522, 183 (1999)

Kinematics and Structure of the Starburst Galaxy NGC 7673. *N. L. Homeier & J. S. Gallagher.* 522, 199 (1999)

^{13}CO J = 1–0 Depression in Luminous Starburst Mergers, Revisited. *Yoshiaki Taniguchi, Youichi Ohyama, & D. B. Sanders.* 522, 214 (1999)

A New Ultradense Group of Obscured Emission-Line Galaxies. *R. Weinberger, S. Temporin, & F. Kerber.* 522, L17 (1999)

Star Formation in Las Campanas Compact Groups. *Sahar S. Allam, Douglas L. Tucker, Huan Lin, & Yasuhiro Hashimoto.* 522, L89 (1999)

Age and Dust Degeneracy for Starburst Galaxies Solved? *Toshinobu Takagi, Nobuo Arimoto, & Vladas Vansevičius.* 523, 107 (1999)

Very Extended X-Ray and Hα Emission in M82: Implications for the Superwind Phenomenon. *Matthew D. Lehnert, Timothy M. Heckman, & Kimberly A. Weaver.* 523, 575 (1999)

A Photometric Investigation of the GRB 970228 Afterglow and the Associated Nebulosity. *Francisco J. Castander & Donald Q. Lamb.* 523, 593 (1999)

Young Galaxies: What Turns Them On? *T. S. Kolatt, J. S. Bullock, R. S. Somerville, Y. Sigad, P. Jonsson, A. V. Kravtsov, A. A. Klypin, J. R. Primack, S. M. Faber, & A. Dekel.* 523, L109 (1999)

Neutral Hydrogen (21 Centimeter) Absorption in Seyfert Galaxies: Evidence for Free-Free Absorption and Subkiloparsec Gaseous Disks. *J. F. Gallimore, S. A. Baum, C. P. O'Dea, A. Pedlar, & E. Brinks.* 524, 684 (1999)

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Neutral Hydrogen (21 Centimeter) Absorption in Seyfert Galaxies: Evidence for Free-Free Absorption and Subkiloparsec Gaseous Disks. *J. F. Gallimore, S. A. Baum, C. P. O'Dea, A. Pedlar, & E. Brinks.* 524, 684 (1999)

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Name: Pleiades

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Evidence for a Population of Numerous Binaries with Comparably Bright Components among *Hipparcos* "Single" F Stars. *A. A. Suchkov & M. McMaster.* 524, L99 (1999)

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A Large Local Rotational Speed for the Galaxy Found from Proper Motions: Implications for the Mass of the Milky Way. *René A. Méndez, Imants Platais, Terrence M. Girard, Vera Kozhurina-Platais, & William F. van Altena.* 524, L39 (1999)

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A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes. *K. Hurley, P. Li, M. Boer, T. Cline, G. J. Fishman, C. Meegan, C. Kouveliotou, J. Greiner, J. Laros, C. Luginbuhl, F. Vrba, T. Murakami, H. Pedersen, & J. van Paradijs.* 524, 92 (1999)

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R. Pacheco, G. Paredes, M. Rengel, L. Romero, P. Rosenzweig, C. Sabbey, Ge. Sánchez, Gu. Sánchez, H. Schenner, J. Shin, J. Sinnott, S. Sofia, J. Stock, J. Suarez, D. Telléria, B. Vicente, K. Vieira, & K. Vivas. 524, L103 (1999)

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Small-Scale Interaction of Turbulence with Thermonuclear Flames in Type Ia Supernovae. *J. C. Niemeyer, W. K. Bushe, & G. R. Ruetsch.* 524, 290 (1999)

Linear Polarization and Proper Motion in the Afterglow of Beamed Gamma-Ray Bursts. *Re'em Sari.* 524, L43 (1999)

A Possible Lateral Gamma-Ray Burst Jet from SN 1987A. *Renyue Cen.* 524, L51 (1999)

On the Dynamics and Structure of Three-dimensional Trans-Alfvénic Jets. *Philip E. Hardee & Alexander Rosen.* 524, 650 (1999)

Dust Coagulation in Infalling Protostellar Envelopes. I. Compact Grains. *Gerhard Suttner, Harold W. Yorke, & Doug N. C. Lin.* 524, 857 (1999)

On the Stability and Evolution of Isolated Bok Globules. *Richard P. Nelson & William D. Langer.* 524, 923 (1999)

INFRARED: GALAXIES

Optical Spectroscopy of the *IRAS* 1 Jy Sample of Ultraluminous Infrared Galaxies. *Sylvain Veilleux, D.-C. Kim, & D. B. Sanders.* 522, 113 (1999)

New Results from a Near-Infrared Search for Hidden Broad-Line Regions in Ultraluminous Infrared Galaxies. *Sylvain Veilleux, D. B. Sanders, & D.-C. Kim.* 522, 139 (1999)

A Semiempirical Model of the Infrared Universe. *Jonathan C. Tan, Joe Silk, & Christophe Balland.* 522, 579 (1999)

Cosmic Histories of Stars, Gas, Heavy Elements, and Dust in Galaxies. *Yichuan C. Pei, S. Michael Fall, & Michael G. Hauser.* 522, 604 (1999)

Luminosity Profiles of Merger Remnants. *J. E. Hibbard & Min S. Yun.* 522, L93 (1999)

The Surface Density of Extremely Red Objects. *D. Thompson, S. V. W. Beckwith, R. Fockenbrock, J. Fried, H. Hippelein, J.-S. Huang, B. von Kuhlmann, Ch. Leinert, K. Meisenheimer, S. Phelps, H.-J. Röser, E. Thommes, & C. Wolf.* 523, 100 (1999)

The X-Ray, Optical, and Infrared Counterpart to GRB 980703. *P. M. Vreeswijk, T. J. Galama, A. Owens, T. Oosterbroek, T. R. Geballe, J. van Paradijs, P. J. Groot, C. Kouveliotou, T. Koshut, N. Tanvir, R. A. M. J. Wijers, E. Pian, E. Palazzi, F. Frontera, N. Masetti, C. Robinson, M. Briggs, J. J. M. in 't Zand, J. Heise, L. Piro, E. Costa, M. Feroci, L. A. Antonelli, K. Hurley, J. Greiner, D. A. Smith, A. M. Levine, Y. Lipkin, E. Leibowitz, C. Lidman, A. Pizzella, H. Böhnhardt, V. Doublier, S. Chaty, I. Smail, A. Blain, J. H. Hough, S. Young, & N. Suntzeff.* 523, 171 (1999)

An *Infrared Space Observatory* Upper Limit to the Low-Mass Star Halo in the Edge-on Galaxy NGC 4565. *Charles Beichman, George Helou, Dave Van Buren, Ken Ganga, & F. X. Desert.* 523, 559 (1999)

A NICMOS Search for High-Redshift Elliptical Galaxy Candidates. *Tommaso Treu & Massimo Stiavelli.* 524, L27 (1999)

INFRARED: GENERAL

TeV Cerenkov Events as Bose-Einstein Gamma Condensations. *Martin Harwit, R. J. Protheroe, & P. L. Biermann.* 524, L91 (1999)

INFRARED: ISM: CONTINUUM

Far-Infrared Observations of the Galactic Star-forming Regions Associated with IRAS 00339+6312 and RAFGL 5111. *B. Mookerjea, S. K. Ghosh, A. D. Karnik, T. N. Rengarajan, S. N. Tandon, & R. P. Verma.* 522, 285 (1999)

Infrared Excess and Molecular Gas in the Galactic Worm GW 46.4+5.5. *Kee-Tae Kim, Jeong-Eun Lee, & Bon-Chul Koo.* 523, 306 (1999)

Extrapolation of Galactic Dust Emission at 100 Microns to Cosmic Microwave Background Radiation Frequencies Using FIRAS. *Douglas P. Finkbeiner, Marc Davis, & David J. Schlegel.* 524, 867 (1999)

INFRARED: ISM: LINES AND BANDS

Observations of H_3^+ in Dense Molecular Clouds. *B. J. McCall, T. R. Geballe, K. H. Hinkle, & T. Oka.* 522, 338 (1999)

Observations of Solid Carbon Dioxide in Molecular Clouds with the *Infrared Space Observatory*. *P. A. Gerakines, D. C. B. Whittet, P. Ehrenfreund, A. C. A. Boogert, A. G. G. M. Tielens, W. A. Schutte, J. E. Chiar, E. F. van Dishoeck, T. Prusti, F. P. Helmich, & Th. de Graauw.* 522, 357 (1999)

2175 Å and 3.4 Micron Absorption Bands and Carbon Depletion in the Diffuse Interstellar Medium. *W. W. Duley & S. S. Seahra.* 522, L129 (1999)

Activation of the 3.4 Micron Band in Carbon Grains by Exposure to Atomic Hydrogen. *V. Mennella, J. R. Brucato, L. Colangeli, & P. Palumbo.* 524, L71 (1999)

INFRARED: SOLAR SYSTEM

H_2 Quadrupole and H_3^+ Emission from Uranus: The Uranian Thermosphere, Ionosphere, and Aurora. *L. M. Trafton, S. Miller, T. R. Geballe, J. Tennyson, & G. E. Ballestar.* 524, 1059 (1999)

INFRARED: STARS

Dust Formation in the Hot Massive Binary HD 192641 = WR 137 (WC 7+OB). *Sergey V. Marchenko, Anthony F. J. Moffat, & Yves Grosdidier.* 522, 433 (1999)

Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey. *Adam J. Burgasser, J. Davy Kirkpatrick, Michael E. Brown, I. Neill Reid, John E. Gizis, Conrad C. Dahn, David G. Monet, Charles A. Beichman, James Liebert, Roc M. Cutri, & Michael F. Skrutskie.* 522, L65 (1999)

The Impact of the Massive Young Star GL 2591 on Its Circumstellar Material: Temperature, Density, and Velocity Structure. *Floris F. S. van der Tak, Ewine F. van Dishoeck, Neal J. Evans II, Eric J. Bakker, & Geoffrey A. Blake.* 522, 991 (1999)

The Quiescent Accretion Disk in IP Pegasi at Near-Infrared Wavelengths. *C. S. Froning, E. L. Robinson, William F. Welsh, & Janet H. Wood.* 523, 399 (1999)

Infrared Candidates for the Intense Galactic X-Ray Source GX 17+2. *Eric W. Deutsch, Bruce Margon, Scott F. Anderson, Stefanie Wachter, & W. M. Goss.* 524, 406 (1999)

INSTABILITIES

Properties of Convective Instability in a Vertical Photospheric Magnetic Flux Tube. *Akitsugu Takeuchi.* 522, 518 (1999)

Optimal Excitation of Magnetic Fields. *Brian F. Farrell & Petros J. Ioannou.* 522, 1079 (1999)

Driving Outflows from Young Stars through the Effects of Internal Disk Fields. *N. J. Turner, P. Bodenheimer, & M. Rózyczka.* 524, 129 (1999)

Magnetized Accreting Stars: Studies of the Inner Accretion-Disk Edge by a Magnetohydrodynamic Approach. II. Ideal Instabilities of the Inner Disk Edge. *Lutz Rastätter & Karl Schindler.* 524, 361 (1999)

On the Dynamics and Structure of Three-dimensional Trans-Alfvénic Jets. *Philip E. Hardee & Alexander Rosen.* 524, 650 (1999)

Magnetically Driven Warping, Precession, and Resonances in Accretion Disks. *Dong Lai.* 524, 1030 (1999)

INSTRUMENTATION: SPECTROGRAPHS

The Very Extended Ionized Nebula around the Quasar MR 2251−178. *P. L. Shopbell, S. Veilleux, & J. Bland-Hawthorn.* 524, L83 (1999)

INTERPLANETARY MEDIUM

Semiempirical Two-dimensional Magnetohydrodynamic Model of the Solar Corona and Interplanetary Medium. *Edward C. Sittler, Jr., & Madhulika Guhathakurta.* 523, 812 (1999)

ISM: ABUNDANCES

Molecular Hydrogen on Astrophysically Relevant Surfaces. *N. Katz, I. Furman, O. Biham, V. Pirronello, & G. Vidali.* 522, 305 (1999)

On the Chemical Abundances of Multiple-Shell Planetary Nebulae with Halos. *M. A. Guerrero & A. Manchado.* 522, 378 (1999)

The ^{3}He Abundance in the Planetary Nebula NGC 3242. *Dana S. Balser, Robert T. Rood, & T. M. Bania.* 522, L73 (1999)

The Abundance of Interstellar Tin and Cadmium. *Ulysses J. Sofia, David M. Meyer, & Jason A. Cardelli.* 522, L137 (1999)

The Abundance of C_7^- in Diffuse Clouds. *Deborah P. Ruffle, R. P. A. Bettens, Radoslava Terzieva, & Eric Herbst.* 523, 678 (1999)

Subarcsecond Resolution Observations of Sagittarius B2 at 85 GHz. *Sheng-Yuan Liu & Lewis E. Snyder.* 523, 683 (1999)

Absolute UV and Vacuum UV Oscillator Strengths for Ni II. *J. A. Fedchak & J. E. Lawler.* 523, 734 (1999)

The D/H Ratio in Interstellar Gas toward G191−B2B. *M. S. Sahu, W. Landsman, F. C. Bruhweiler, T. R. Gull, C. A. Bowers, D. Lindler, K. Feggans, M. A. Barstow, I. Hubeny, & J. B. Holberg.* 523, L159 (1999)

GHRS and *ORFEUS II* Observations of the Highly Ionized Interstellar Medium toward ESO 141−055. *Kenneth R. Sembach, Blair D. Savage, & Mark Hurwitz.* 524, 98 (1999)

ISM: ATOMS

WHAM Observations of Hα, [S II], and [N II] toward the Orion and Perseus Arms: Probing the Physical Conditions of the Warm Ionized Medium. *L. M. Haffner, R. J. Reynolds, & S. L. Tufte.* 523, 223 (1999)

Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud. *Hiroyuki Maezawa, Masafumi Ikeda, Tetsuya Ito, Gaku Saito, Yutaro Sekimoto, Satoshi Yamamoto, Ken'ichi Tatematsu, Yuji Arikawa, Yoshiyuki Aso, Takashi Noguchi, Sheng-Cai Shi, Keisuke Miyazawa, Shuji Saito, Hiroyuki Ozeki, Hideo Fujiwara, Masatoshi Ohishi, & Junji Inatani.* 524, L129 (1999)

ISM: BUBBLES

Superbubble Evolution Including the Star-forming Clouds: Is It Possible to Reconcile Large Magellanic Cloud Observations with Model Predictions? *Sergei Silich & José Franco.* 522, 863 (1999)

ISM: CLOUDS

Star Formation in the Giant H II Regions of M101. *Jean Giannakopoulou-Creighton, Michel Fich, & Christine D. Wilson.* 522, 238 (1999)

Multipressure Polytropes as Models for the Structure and Stability of Molecular Clouds. I. Theory. *Christopher F. McKee & John H. Holliman II.* 522, 313 (1999)

Observations of H_3^+ in Dense Molecular Clouds. *B. J. McCall, T. R. Geballe, K. H. Hinkle, & T. Oka.* 522, 338 (1999)

Superbubble Evolution Including the Star-forming Clouds: Is It Possible to Reconcile Large Magellanic Cloud Observations with Model Predictions? *Sergei Silich & José Franco.* 522, 863 (1999)

A New Method for Determining the Dust Temperature Distribution in Star-forming Regions. *Di Li, Paul F. Goldsmith, & Taoling Xie.* 522, 897 (1999)

On the Turbulent Velocity Dispersion in Molecular Clouds. *P. C. Myers & C. F. Gammie.* 522, L141 (1999)

The Abundance of C_7^- in Diffuse Clouds. *Deborah P. Ruffle, R. P. A. Bettens, Radoslava Terzieva, & Eric Herbst.* 523, 678 (1999)

Mass and Physical Conditions of Molecular Gas at Cosmological Distances Probed with CO Lines. *Seiichi Sakamoto.* 523, 701 (1999)

Criteria for Fragmentation of Rotating Isothermal Clouds Revisited. *Toru Tsuribe & Shu-Ichiro Inutsuka.* 523, L155 (1999)

GHRS and *ORFEUS II* Observations of the Highly Ionized Interstellar Medium toward ESO 141−055. *Kenneth R. Sembach, Blair D. Savage, & Mark Hurwitz.* 524, 98 (1999)

The Energy Dissipation Rate of Supersonic, Magnetohydrodynamic Turbulence in Molecular Clouds. *Mordecai-Mark Mac Low.* 524, 169 (1999)

Velocity Field Statistics in Star-forming Regions. I. Centroid Velocity Observations. *Mark S. Miesch, John Scalo, & John Bally.* 524, 895 (1999)

On the Stability and Evolution of Isolated Bok Globules. *Richard P. Nelson & William D. Langer.* 524, 923 (1999)

Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud. *Hiroyuki Maezawa, Masafumi Ikeda, Tetsuya Ito, Gaku Saito, Yutaro Sekimoto, Satoshi Yamamoto, Ken'ichi Tatematsu, Yuji Arikawa, Yoshiyuki Aso, Takashi Noguchi, Sheng-Cai Shi, Keisuke Miyazawa, Shuji Saito, Hiroyuki Ozeki, Hideo Fujiwara, Masatoshi Ohishi, & Junji Inatani.* 524, L129 (1999)

ISM: COSMIC RAYS

Small-Scale Anisotropy of Cosmic Rays above 10^{19} eV Observed with the Akeno Giant Air Shower Array. *M. Takeda, N. Hayashida, K. Honda, N. Inoue, K. Kadota, F. Kakimoto, K. Kamata, S. Kawaguchi, Y. Kawasaki, N. Kawasumi, E. Kusano, Y. Matsubara, K. Murakami, M. Nagano, D. Nishikawa, H. Ohoka, S. Osone, N. Sakaki, M. Sasaki, K. Shinozaki, N. Souma, M. Teshima, R. Torii, I. Tsushima, Y. Uchihori, T. Yamamoto, S. Yoshida, & H. Yoshii.* 522, 225 (1999)

Evolution of Beryllium and Boron in the Inhomogeneous Early Galaxy. *Takeru Ken Suzuki, Yuzuru Yoshii, & Toshitaka Kajino.* 522, L125 (1999)

Constraints on the Time Delay between Nucleosynthesis and Cosmic-Ray Acceleration from Observations of Ni and Co. *M. E. Wiedenbeck, W. R. Binns, E. R. Christian, A. C. Cummings, B. L. Dougherty, P. L. Hink,*

J. Klarmann, R. A. Leske, M. Lijowski, R. A. Mewaldt, E. C. Stone, M. R. Thayer, T. T. von Rosenvinge, & N. E. Yanasak. 523, L61 (1999)

A Two-dimensional, Self-consistent Model of Galactic Cosmic Rays in the Heliosphere. *V. Florinski & J. R. Jokipii.* 523, L185 (1999)

ISM: DUST, EXTINCTION

Dust-to-Gas Ratio and Metallicity in Dwarf Galaxies. *Hiroyuki Hirashita.* 522, 220 (1999)

Molecular Hydrogen on Astrophysically Relevant Surfaces. *N. Katz, I. Furman, O. Biham, V. Pirronello, & G. Vidali.* 522, 305 (1999)

Observations of Solid Carbon Dioxide in Molecular Clouds with the *Infrared Space Observatory*. *P. A. Gerakines, D. C. B. Whittet, P. Ehrenfreund, A. C. A. Boogert, A. G. G. M. Tielens, W. A. Schutte, J. E. Chiar, E. F. van Dishoeck, T. Prusti, F. P. Helmich, & Th. de Graauw.* 522, 357 (1999)

A New Method for Determining the Dust Temperature Distribution in Star-forming Regions. *Di Li, Paul F. Goldsmith, & Taoling Xie.* 522, 897 (1999)

2175 Å and 3.4 Micron Absorption Bands and Carbon Depletion in the Diffuse Interstellar Medium. *W. W. Duley & S. S. Seahra.* 522, L129 (1999)

Age and Dust Degeneracy for Starburst Galaxies Solved? *Toshinobu Takagi, Nobuo Arimoto, & Vladas Vansevičius.* 523, 107 (1999)

Analytical Approximations for Calculating the Escape and Absorption of Radiation in Clumpy Dusty Environments. *Frank Városi & Eli Dwek.* 523, 265 (1999)

The Extinction toward the GRB 970228 Field. *Francisco J. Castander & Donald Q. Lamb.* 523, 602 (1999)

Dust and Extinction Curves in Galaxies with $z > 0$: The Interstellar Medium of Gravitational Lens Galaxies. *E. E. Falco, C. D. Impey, C. S. Kochanek, J. Lehár, B. A. McLeod, H.-W. Rix, C. R. Keeton, J. A. Muñoz, & C. Y Peng.* 523, 617 (1999)

Subarcsecond Resolution Observations of Sagittarius B2 at 85 GHz. *Sheng-Yuan Liu & Lewis E. Snyder.* 523, 683 (1999)

CO Depletion in the Starless Cloud Core L1544. *P. Caselli, C. M. Walmsley, M. Tafalla, L. Dore, & P. C. Myers.* 523, L165 (1999)

Activation of the 3.4 Micron Band in Carbon Grains by Exposure to Atomic Hydrogen. *V. Mennella, J. R. Brucato, L. Colangeli, & P. Palumbo.* 524, L71 (1999)

Dust Coagulation in Infalling Protostellar Envelopes. I. Compact Grains. *Gerhard Suttner, Harold W. Yorke, & Doug N. C. Lin.* 524, 857 (1999)

Extrapolation of Galactic Dust Emission at 100 Microns to Cosmic Microwave Background Radiation Frequencies Using FIRAS. *Douglas P. Finkbeiner, Marc Davis, & David J. Schlegel.* 524, 867 (1999)

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Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud. *Hiroyuki Maezawa, Masafumi Ikeda, Tetsuya Ito, Gaku Saito, Yutaro Sekimoto, Satoshi Yamamoto, Ken'ichi Tatematsu, Yuji Arikawa, Yoshiyuki Aso, Takashi Noguchi, Sheng-Cai Shi, Keisuke Miyazawa, Shuji Saito, Hiroyuki Ozeki, Hideo Fujiwara, Masatoshi Ohishi, & Junji Inatani.* 524, L129 (1999)

ISM: GENERAL

A Prediction of Brown Dwarfs in Ultracold Molecular Gas. *Bruce G. Elmegreen.* 522, 915 (1999)

Statistical Theory of Anisotropic Magnetohydrodynamic Turbulence: An Approach to Strong Shear Alfvén Turbulence by Direct-Interaction Approximation. *Kunji Nakayama.* 523, 315 (1999)

Parallax of PSR J1744−1134 and the Local Interstellar Medium. *M. Toscano, M. C. Britton, R. N. Manchester, M. Bailes, J. S. Sandhu, S. R. Kulkarni, & S. B. Anderson.* 523, L171 (1999)

Modeling W44 as a Supernova Remnant in a Density Gradient with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. I. The Analytical Model. *Donald P. Cox, R. L. Shelton, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka.* 524, 179 (1999)

ISM: GLOBULES

A New Method for Determining the Dust Temperature Distribution in Star-forming Regions. *Di Li, Paul F. Goldsmith, & Taoling Xie.* 522, 897 (1999)

ISM: H II REGIONS

Far-Infrared Observations of the Galactic Star-forming Regions Associated with IRAS 00339+6312 and RAFGL 5111. *B. Mookerjea, S. K. Ghosh, A. D. Karnik, T. N. Rengarajan, S. N. Tandon, & R. P. Verma.* 522, 285 (1999)

Two-dimensional Magnetohydrodynamics and Interstellar Plasma Turbulence. *Steven R. Spangler.* 522, 879 (1999)

WHAM Observations of Hα, [S II], and [N II] toward the Orion and Perseus Arms: Probing the Physical Conditions of the Warm Ionized Medium. *L. M. Haffner, R. J. Reynolds, & S. L. Tufte.* 523, 223 (1999)

A 1000 AU Rotating Disk around the Massive Young Stellar Object G192.16−3.82. *D. S. Shepherd & S. E. Kurtz.* 523, 690 (1999)

The Nature of the Diffuse Clumps and the X-Ray Companion of Markarian 273. *X.-Y. Xia, S. Mao, H. Wu, X.-W. Liu, Y. Gao, Z.-G. Deng, & Z.-L. Zou.* 524, 746 (1999)

ISM: INDIVIDUAL

Name: Heiles's cloud 2

Large-Scale Mapping Observations of the C I $^3P_1$–$^3P_0$ Line toward Heiles Cloud 2 in the Taurus Dark Cloud. *Hiroyuki Maezawa, Masafumi Ikeda, Tetsuya Ito, Gaku Saito, Yutaro Sekimoto, Satoshi Yamamoto, Ken'ichi Tatematsu, Yuji Arikawa, Yoshiyuki Aso, Takashi Noguchi, Sheng-Cai Shi, Keisuke Miyazawa, Shuji Saito, Hiroyuki Ozeki, Hideo Fujiwara, Masatoshi Ohishi, & Junji Inatani.* 524, L129 (1999)

Name: Sagittarius A*

High-Energy Emission from Relativistic Particles in Sagittarius A*. *Sera Markoff, Fulvio Melia, & Ina Sarcevic.* 522, 870 (1999)

Proper Motion of the Compact, Nonthermal Radio Source in the Galactic Center, Sagittarius A*. *D. C. Backer & R. A. Sramek.* 524, 805 (1999)

The Proper Motion of Sagittarius A*. I. First VLBA Results. *M. J. Reid, A. C. S. Readhead, R. C. Vermeulen, & R. N. Treuhaft.* 524, 816 (1999)

Name: Sagittarius B2

Subarcsecond Resolution Observations of Sagittarius B2 at 85 GHz. *Sheng-Yuan Liu & Lewis E. Snyder.* 523, 683 (1999)

NGC Number: NGC 2071

The HCO^+ Molecular Outflow in NGC 2071. *José M. Girart, Paul T. P. Ho, Alexander L. Rudolph, Robert Estalella, David J. Wilner, & Lawrence M. Chernin.* 522, 921 (1999)

Alphanumeric: CRL 618

Activation of the 3.4 Micron Band in Carbon Grains by Exposure to Atomic Hydrogen. *V. Mennella, J. R. Brucato, L. Colangeli, & P. Palumbo.* 524, L71 (1999)

Alphanumeric: G192.16−3.82

A 1000 AU Rotating Disk around the Massive Young Stellar Object G192.16−3.82. *D. S. Shepherd & S. E. Kurtz.* 523, 690 (1999)

Alphanumeric: GC IRS 6E

Activation of the 3.4 Micron Band in Carbon Grains by Exposure to Atomic Hydrogen. *V. Mennella, J. R. Brucato, L. Colangeli, & P. Palumbo.* 524, L71 (1999)

Alphanumeric: GW 46.4+5.5

Infrared Excess and Molecular Gas in the Galactic Worm GW 46.4+5.5. *Kee-Tae Kim, Jeong-Eun Lee, & Bon-Chul Koo.* 523, 306 (1999)

Alphanumeric: IRAS 00338+6312

Far-Infrared Observations of the Galactic Star-forming Regions Associated with IRAS 00339+6312 and RAFGL 5111. *B. Mookerjea, S. K. Ghosh, A. D. Karnik, T. N. Rengarajan, S. N. Tandon, & R. P. Verma.* 522, 285 (1999)

Alphanumeric: IRAS 03595+5110

Far-Infrared Observations of the Galactic Star-forming Regions Associated with IRAS 00339+6312 and RAFGL 5111. *B. Mookerjea, S. K. Ghosh, A. D. Karnik, T. N. Rengarajan, S. N. Tandon, & R. P. Verma.* 522, 285 (1999)

Alphanumeric: L1544

CO Depletion in the Starless Cloud Core L1544. *P. Caselli, C. M. Walmsley, M. Tafalla, L. Dore, & P. C. Myers.* 523, L165 (1999)

Alphanumeric: W28

The Sizes of 1720 MHz OH Masers: VLBA and MERLIN Observations of the Supernova Remnants W44 and W28. *M. J. Claussen, W. M. Goss, D. A. Frail, & K. Desai.* 522, 349 (1999)

Alphanumeric: W44

The Sizes of 1720 MHz OH Masers: VLBA and MERLIN Observations of the Supernova Remnants W44 and W28. *M. J. Claussen, W. M. Goss, D. A. Frail, & K. Desai.* 522, 349 (1999)

Modeling W44 as a Supernova Remnant in a Density Gradient with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. I. The Analytical Model. *Donald P. Cox, R. L. Shelton, Witold Maciejewski,*

Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka. 524, 179 (1999)

Modeling W44 as a Supernova Remnant in a Density Gradient, with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. II. The Hydrodynamic Models. *R. L. Shelton, Donald P. Cox, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Różyczka.* 524, 192 (1999)

ISM: JETS AND OUTFLOWS

The [N II] Kinematics of R Aquarii. *J. M. Hollis, S. N. Vogel, D. Van Buren, J. P. Strong, R. G. Lyon, & J. E. Dorband.* 522, 297 (1999)

Fe II Bubbles in the Young Planetary Nebula Hubble 12. *Charles A. Welch, A. Frank, Judith L. Pipher, W. J. Forrest, & Charles E. Woodward.* 522, L69 (1999)

The HCO^+ Molecular Outflow in NGC 2071. *José M. Girart, Paul T. P. Ho, Alexander L. Rudolph, Robert Estalella, David J. Wilner, & Lawrence M. Chernin.* 522, 921 (1999)

A 1000 AU Rotating Disk around the Massive Young Stellar Object G192.16−3.82. *D. S. Shepherd & S. E. Kurtz.* 523, 690 (1999)

A Deep Long-Slit Spectroscopic Study of the Two Bipolar Outflows from the T Tauri Binary System. *J. Solf & K.-H. Bohm.* 523, 709 (1999)

Jets, Knots, and Tails in Planetary Nebulae: NGC 3918, K1-2, and Wray 17-1. *Romano L. M. Corradi, Mario Perinotto, Eva Villaver, Antonio Mampaso, & Denise R. Gonçalves.* 523, 721 (1999)

Driving Outflows from Young Stars through the Effects of Internal Disk Fields. *N. J. Turner, P. Bodenheimer, & M. Różyczka.* 524, 129 (1999)

Jets from Accreting Magnetic Young Stellar Objects. I. Comparison of Observations and High-Resolution Simulation Results. *Anthony P. Goodson, Karl-Heinz Böhm, & Robert M. Winglee.* 524, 142 (1999)

Jets from Accreting Magnetic Young Stellar Objects. II. Mechanism Physics. *Anthony P. Goodson & Robert M. Winglee.* 524, 159 (1999)

Ambipolar Diffusion in Young Stellar Object Jets. *Adam Frank, Thomas A. Gardiner, Guy Delemarter, Thibaut Lery, & Riccardo Betti.* 524, 947 (1999)

Accretion Disks in Pre–Planetary Nebulae. *M. Reyes-Ruiz & J. A. López.* 524, 952 (1999)

Jet-induced Explosions of Core Collapse Supernovae. *A. M. Khokhlov, P. A. Höflich, E. S. Oran, J. C. Wheeler, L. Wang, & A. Yu. Chtchelkanova.* 524, L107 (1999)

ISM: KINEMATICS AND DYNAMICS

The Kinematics of Stars Emerging from Expanding Shells: An Analysis of the Gould Belt. *Edmundo Moreno, Emilio J. Alfaro, & José Franco.* 522, 276 (1999)

Bar Diagnostics in Edge-on Spiral Galaxies. II. Hydrodynamical Simulations. *E. Athanassoula & M. Bureau.* 522, 699 (1999)

A Deep Long-Slit Spectroscopic Study of the Two Bipolar Outflows from the T Tauri Binary System. *J. Solf & K.-H. Bohm.* 523, 709 (1999)

Jets, Knots, and Tails in Planetary Nebulae: NGC 3918, K1-2, and Wray 17-1. *Romano L. M. Corradi, Mario Perinotto, Eva Villaver, Antonio Mampaso, & Denise R. Gonçalves.* 523, 721 (1999)

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ISM: MAGNETIC FIELDS

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First Extragalactic Direct Detection of Large-Scale Molecular Hydrogen in the Disk of NGC 891. *Edwin A. Valentijn & Paul P. van der Werf.* 522, L29 (1999)

The HCO^+ Molecular Outflow in NGC 2071. *José M. Girart, Paul T. P. Ho, Alexander L. Rudolph, Robert Estalella, David J. Wilner, & Lawrence M. Chernin.* 522, 921 (1999)

Luminosity Profiles of Merger Remnants. *J. E. Hibbard & Min S. Yun.* 522, L93 (1999)

2175 Å and 3.4 Micron Absorption Bands and Carbon Depletion in the Diffuse Interstellar Medium. *W. W. Duley & S. S. Seahra.* 522, L129 (1999)

Infrared Excess and Molecular Gas in the Galactic Worm GW 46.4+5.5. *Kee-Tae Kim, Jeong-Eun Lee, & Bon-Chul Koo.* 523, 306 (1999)

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The Abundance of C_7^- in Diffuse Clouds. *Deborah P. Ruffle, R. P. A. Bettens, Radoslava Terzieva, & Eric Herbst.* 523, 678 (1999)

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GHRS and *ORFEUS II* Observations of the Highly Ionized Interstellar Medium toward ESO 141−055. *Kenneth R. Sembach, Blair D. Savage, & Mark Hurwitz.* 524, 98 (1999)

Velocity Field Statistics in Star-forming Regions. I. Centroid Velocity Observations. *Mark S. Miesch, John Scalo, & John Bally.* 524, 895 (1999)

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ISM: PLANETARY NEBULAE: GENERAL

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ISM: PLANETARY NEBULAE: INDIVIDUAL

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On the Chemical Abundances of Multiple-Shell Planetary Nebulae with Halos. *M. A. Guerrero & A. Manchado.* 522, 378 (1999)

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Jets, Knots, and Tails in Planetary Nebulae: NGC 3918, K1-2, and Wray 17-1. *Romano L. M. Corradi, Mario Perinotto, Eva Villaver, Antonio Mampaso, & Denise R. Gonçalves.* 523, 721 (1999)

NGC Number: NGC 5882

On the Chemical Abundances of Multiple-Shell Planetary Nebulae with Halos. *M. A. Guerrero & A. Manchado.* 522, 378 (1999)

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Jets, Knots, and Tails in Planetary Nebulae: NGC 3918, K1-2, and Wray 17-1. *Romano L. M. Corradi, Mario Perinotto, Eva Villaver, Antonio Mampaso, & Denise R. Gonçalves.* 523, 721 (1999)

Alphanumeric: Wray 17-1

Jets, Knots, and Tails in Planetary Nebulae: NGC 3918, K1-2, and Wray 17-1. *Romano L. M. Corradi, Mario Perinotto, Eva Villaver, Antonio Mampaso, & Denise R. Gonçalves.* 523, 721 (1999)

ISM: REFLECTION NEBULAE

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Modeling W44 as a Supernova Remnant in a Density Gradient with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. I. The Analytical Model. *Donald P. Cox, R. L. Shelton, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Rózyczka.* 524, 179 (1999)

Modeling W44 as a Supernova Remnant in a Density Gradient, with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. II. The Hydrodynamic Models. *R. L. Shelton, Donald P. Cox, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Rózyczka.* 524, 192 (1999)

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Statistical Analysis of Spectral Line Candidates in Gamma-Ray Burst GRB 870303. *P. E. Freeman, C. Graziani, D. Q. Lamb, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 753 (1999)

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A Magnetically Switched, Rotating Black Hole Model for the Production of Extragalactic Radio Jets and the Fanaroff and Riley Class Division. *D. L. Meier.* 522, 753 (1999)

Two-dimensional Magnetohydrodynamics and Interstellar Plasma Turbulence. *Steven R. Spangler.* 522, 879 (1999)

Two-Component Theoretical Chromosphere Models for K Dwarfs of Different Magnetic Activity: Exploring the Ca II Emission–Stellar Rotation Relationship. *M. Cuntz, W. Rammacher, P. Ulmschneider, Z. E. Musielak, & S. H. Saar.* 522, 1053 (1999)

Optimal Excitation of Magnetic Fields. *Brian F. Farrell & Petros J. Ioannou.* 522, 1079 (1999)

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Joint Instability of Latitudinal Differential Rotation and Toroidal Magnetic Fields below the Solar Convection Zone. III. Unstable Disturbance Phenomenology and the Solar Cycle. *P. A. Gilman & P. A. Fox.* 522, 1167 (1999)

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Statistical Theory of Anisotropic Magnetohydrodynamic Turbulence: An Approach to Strong Shear Alfvén Turbulence by Direct-Interaction Approximation. *Kunji Nakayama.* 523, 315 (1999)

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Jets from Accreting Magnetic Young Stellar Objects. II. Mechanism Physics. *Anthony P. Goodson & Robert M. Winglee.* 524, 159 (1999)

Modeling W44 as a Supernova Remnant in a Density Gradient, with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. II. The Hydrodynamic Models. *R. L. Shelton, Donald P. Cox, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Rózyczka.* 524, 192 (1999)

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Average Emissivity Curve of BATSE Gamma-Ray Bursts with Different Intensities. *Igor G. Mitrofanov, Maxim L. Litvak, Michael S. Briggs, William S. Paciesas, Geoffrey N. Pendleton, Robert D. Preece, & Charles A. Meegan.* 523, 610 (1999)

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The Brera Multiscale Wavelet *ROSAT* HRI Source Catalog. II. Application to the HRI and First Results. *Sergio Campana, Davide Lazzati, Maria Rosa Panzera, & Gianpiero Tagliaferri.* 524, 423 (1999)

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The MgH $B'\ ^2\Sigma^+$–$X\ ^2\Sigma^+$ Transition: A New Tool for Studying Magnesium Isotope Abundances. *Lloyd Wallace, Kenneth Hinkle, Gang Li, & Peter Bernath.* 524, 454 (1999)

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Laser Spectroscopy of the Carbon Chains HC_7H and HC_9H. *C. D. Ball, M. C. McCarthy, & P. Thaddeus.* 523, L89 (1999)

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Rate Coefficients for Ro-vibrational Transitions in H_2 Due to Collisions with He. *N. Balakrishnan, M. Vieira, J. F. Babb, A. Dalgarno, J. F. Forrey, & S. Lepp.* 524, 1122 (1999)

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De-Excitation of ^{180}mTa by ^{60}Co Gamma Rays. *I. Bikit, L. Lakosi, J. Sáfár, & Lj. Čonkić.* 522, 419 (1999)

Transient Gamma-Ray Observations of Gamma-Ray Lines from Novae. I. Limits on the Positron Annihilation Line in Five Individual Novae. *M. J. Harris, J. E. Naya, B. J. Teegarden, T. L. Cline, N. Gehrels, D. M. Palmer, R. Ramaty, & H. Seifert.* 522, 424 (1999)

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Lithium Isotope Ratios in Halo Stars. III. *L. M. Hobbs, J. A. Thorburn, & L. M. Rebull.* 523, 797 (1999)

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Explosive Hydrogen Burning of ^{27}Si, ^{31}S, ^{35}Ar, and ^{39}Ca in Novae and X-Ray Bursts. *Christian Iliadis, Pieter M. Endt, Nikos Prantzos, & William J. Thompson.* 524, 434 (1999)

The Rapid Proton Process Ashes from Stable Nuclear Burning on an Accreting Neutron Star. *Hendrik Schatz, Lars Bildsten, Andrew Cumming, & Michael Wiescher.* 524, 1014 (1999)

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Optical Monitoring Sample of the GeV Gamma-Ray–loud Blazars. *G. Z. Xie, K. H. Li, X. Zhang, J. M. Bai, & W. W. Liu.* 522, 846 (1999)

High-Energy Emission from Relativistic Particles in Sagittarius A*. *Sera Markoff, Fulvio Melia, & Ina Sarcevic.* 522, 870 (1999)

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Physical Parameters of GRB 970508 and GRB 971214 from Their Afterglow Synchrotron Emission. *R. A. M. J. Wijers & T. J. Galama.* 523, 177 (1999)

Formation of Relativistic Outflows in Shearing Black Hole Accretion Coronae. *Prasad Subramanian, Peter A. Becker, & Demosthenes Kazanas.* 523, 203 (1999)

Detection of Circular Polarization in the Galactic Center Black Hole Candidate Sagittarius A*. *Geoffrey C. Bower, Heino Falcke, & Donald C. Backer.* 523, L29 (1999)

Detection of Polarization in the Afterglow of GRB 990510 with the ESO Very Large Telescope. *R. A. M. J. Wijers, P. M. Vreeswijk, T. J. Galama, E. Rol, J. van Paradijs, C. Kouveliotou, T. Giblin, N. Masetti, E. Palazzi, E. Pian, F. Frontera, L. Nicastro, R. Falomo, P. Soffitta, & L. Piro.* 523, L33 (1999)

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Resonant Cyclotron Radiation Transfer Model Fits to Spectra from Gamma-Ray Burst GRB 870303. *P. E. Freeman, D. Q. Lamb, J. C. L. Wang, I. Wasserman, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 772 (1999)

Dust Coagulation in Infalling Protostellar Envelopes. I. Compact Grains. *Gerhard Suttner, Harold W. Yorke, & Doug N. C. Lin.* 524, 857 (1999)

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A New High-Resolution CO Map of the Inner 2.5 Arcminutes of M51. I. Streaming Motions and Spiral Structure. *S. Aalto, S. Hüttemeister, N. Z. Scoville, & P. Thaddeus.* 522, 165 (1999)

Radio Emission of Shakhbazian Compact Galaxy Groups. *H. M. Tovmassian, V. H. Chavushyan, O. V. Verkhodanov, & H. Tiersch.* 523, 87 (1999)

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Optical and Radio Observations of the Afterglow from GRB 990510: Evidence for a Jet. *F. A. Harrison, J. S. Bloom, D. A. Frail, R. Sari, S. R. Kulkarni, S. G. Djorgovski, T. Axelrod, J. Mould, B. P. Schmidt, M. H. Wieringa, R. M. Wark, R. Subrahmanyan, D. McConnell, P. J. McCarthy, B. E. Schaefer, R. G. McMahon, R. O. Markze, E. Firth, P. Soffita, & L. Amati.* 523, L121 (1999)

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Modeling W44 as a Supernova Remnant in a Density Gradient with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. I. The Analytical Model. *Donald P. Cox, R. L. Shelton, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Rózyczka.* 524, 179 (1999)

Modeling W44 as a Supernova Remnant in a Density Gradient, with a Partially Formed Dense Shell and Thermal Conduction in the Hot Interior. II. The Hydrodynamic Models. *R. L. Shelton, Donald P. Cox, Witold Maciejewski, Randall K. Smith, Tomasz Plewa, Andrew Pawl, & Michał Rózyczka.* 524, 192 (1999)

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Second-Harmonic Plasma Radiation of Magnetically Trapped Electrons in Stellar Coronae. *A. V. Stepanov, B. Kliem, A. Krüger, J. Hildebrandt, & V. I. Garaimov.* 524, 961 (1999)

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Neutral Hydrogen (21 Centimeter) Absorption in Seyfert Galaxies: Evidence for Free-Free Absorption and Subkiloparsec Gaseous Disks. *J. F. Gallimore, S. A. Baum, C. P. O'Dea, A. Pedlar, & E. Brinks.* 524, 684 (1999)

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The HCO^+ Molecular Outflow in NGC 2071. *José M. Girart, Paul T. P. Ho, Alexander L. Rudolph, Robert Estalella, David J. Wilner, & Lawrence M. Chernin.* 522, 921 (1999)

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Infrared Excess and Molecular Gas in the Galactic Worm GW 46.4+5.5. *Kee-Tae Kim, Jeong-Eun Lee, & Bon-Chul Koo.* 523, 306 (1999)

Subarcsecond Resolution Observations of Sagittarius B2 at 85 GHz. *Sheng-Yuan Liu & Lewis E. Snyder.* 523, 683 (1999)

Mass and Physical Conditions of Molecular Gas at Cosmological Distances Probed with CO Lines. *Seiichi Sakamoto.* 523, 701 (1999)

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Transient Emission from Dissipative Fronts in Magnetized, Relativistic Outflows. II. Synchrotron Flares. *Amir Levinson.* 522, 93 (1999)

Relativistic Jet Formation from Black Hole Magnetized Accretion Disks: Method, Tests, and Applications of a General Relativistic Magnetohydrodynamic Numerical Code. *Shinji Koide, Kazunari Shibata, & Takahiro Kudoh.* 522, 727 (1999)

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Post-Newtonian Theory for Precision Doppler Measurements of Binary Star Orbits. *S. M. Kopeikin & L. M. Ozernoy.* 523, 771 (1999)

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A Multicloud Warm-Absorber Model for NGC 4051. *M. Contini & S. M. Viegas.* 523, 114 (1999)

Physical Parameters of GRB 970508 and GRB 971214 from Their Afterglow Synchrotron Emission. *R. A. M. J. Wijers & T. J. Galama.* 523, 177 (1999)

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Hot Horizontal-Branch Stars: The Ubiquitous Nature of the "Jump" in Strömgren *u*, Low Gravities, and the Role of Radiative Levitation of Metals. *F. Grundahl, M. Catelan, W. B. Landsman, P. B. Stetson, & M. I. Andersen.* 524, 242 (1999)

An Abundance Analysis of Two Carbon-rich Proto–Planetary Nebulae: IRAS Z02229+6208 and IRAS 07430+1115. *Bacham E. Reddy, Eric J. Bakker, & Bruce J. Hrivnak.* 524, 831 (1999)

Abundances of the Elements in Sharp-lined Early-Type Stars from *IUE* High-Dispersion Spectrograms. II. The Nitrogen Deficiency in Mercury-Manganese Stars. *Scott W. Roby, David S. Leckrone, & Saul J. Adelman.* 524, 974 (1999)

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Time Evolution of the Magnetic Activity Cycle Period. II. Results for an Expanded Stellar Sample. *Steven H. Saar & Axel Brandenburg.* 524, 295 (1999)

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Circumstellar Hibonite and Corundum and Nucleosynthesis in Asymptotic Giant Branch Stars. *Byeon-Gak Choi, G. J. Wasserburg, & Gary R. Huss.* 522, L133 (1999)

An Abundance Analysis of Two Carbon-rich Proto–Planetary Nebulae: IRAS Z02229+6208 and IRAS 07430+1115. *Bacham E. Reddy, Eric J. Bakker, & Bruce J. Hrivnak.* 524, 831 (1999)

The Discovery of Two New Bipolar Proto–Planetary Nebulae: IRAS 16594−4656 and IRAS 17245−3951. *Bruce J. Hrivnak, Sun Kwok, & Kate Y. L. Su.* 524, 849 (1999)

Accretion Disks in Pre–Planetary Nebulae. *M. Reyes-Ruiz & J. A. López.* 524, 952 (1999)

Modeling Lithium-rich Carbon Stars in the Large Magellanic Cloud: An Independent Distance Indicator? *Paolo Ventura, Francesca D'Antona, & Italo Mazzitelli.* 524, L111 (1999)

Discovery of a Remarkable Point-Symmetric Proto–Planetary Nebula: *Hubble Space Telescope* Imaging of IRAS 04296+3429. *Raghvendra Sahai.* 524, L125 (1999)

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Low-Luminosity States of the Black Hole Candidate GX 339−4. I. *ASCA* and Simultaneous Radio/*RXTE* Observations. *Jörn Wilms, Michael A. Nowak, James B. Dove, Robert P. Fender, & Tiziana Di Matteo.* 522, 460 (1999)

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The Origin of the Diversity of Type Ia Supernovae and the Environmental Effects. *Hideyuki Umeda, Ken'ichi Nomoto, Chiaki Kobayashi, Izumi Hachisu, & Mariko Kato.* 522, L43 (1999)

Transient Radio Emission from SAX J1808.4−3658. *B. M. Gaensler, B. W. Stappers, & T. J. Getts.* 522, L117 (1999)

Stellar Masses, Kinematics, and White Dwarf Composition for Three Close DA+dMe Binaries. *Stéphane Vennes, John R. Thorstensen, & Elisha F. Polomski.* 523, 386 (1999)

A New Bursting X-Ray Transient: SAX J1750.8−2900. *L. Natalucci, R. Cornelisse, A. Bazzano, M. Cocchi, P. Ubertini, J. Heise, J. J. M. in 't Zand, & E. Kuulkers.* 523, L45 (1999)

A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features. *A. Santangelo, A. Segreto, S. Giarrusso, D. Dal Fiume, M. Orlandini, A. N. Parmar, T. Oosterbroek, T. Bulik, T. Mihara, S. Campana, G. L. Israel, & L. Stella.* 523, L85 (1999)

The Eclipsing Cataclysmic Variable V347 Puppis Revisited. *Marcos P. Diaz & Hubeny Ivan.* 523, 786 (1999)

On X-Ray Variability in Active Binary Stars. *Vinay Kashyap & Jeremy J. Drake.* 524, 988 (1999)

STARS: BINARIES: ECLIPSING

Variable and Embedded Stars in the Galactic Center. *Thomas Ott, Andreas Eckart, & Reinhard Genzel.* 523, 248 (1999)

The Quiescent Accretion Disk in IP Pegasi at Near-Infrared Wavelengths. *C. S. Froning, E. L. Robinson, William F. Welsh, & Janet H. Wood.* 523, 399 (1999)

STARS: BINARIES: GENERAL

Spectroscopic Monitoring of the Be/X-Ray Pulsar X Persei/4U 0352+309 with the *ORFEUS*-SPAS II and the *IUE*. *Myron A. Smith & Paul Roche.* 522, 444 (1999)

The Triple Pulsar System PSR B1620−26 in M4. *S. E. Thorsett, Z. Arzoumanian, F. Camilo, & A. G. Lyne.* 523, 763 (1999)

Post-Newtonian Theory for Precision Doppler Measurements of Binary Star Orbits. *S. M. Kopeikin & L. M. Ozernoy.* 523, 771 (1999)

Evidence for a Population of Numerous Binaries with Comparably Bright Components among *Hipparcos* "Single" F Stars. *A. A. Suchkov & M. McMaster.* 524, L99 (1999)

STARS: BINARIES: SPECTROSCOPIC

Toward an Orbit for the High-Luminosity Cepheid T Monocerotis. *Nancy Remage Evans, Kenneth Carpenter, Richard Robinson, Derck Massa, Glenn M. Wahlgren, Jozsef Vinko, & Laszlo Szabados.* 524, 379 (1999)

STARS: BINARIES: SYMBIOTIC

A Wide Symbiotic Channel to Type Ia Supernovae. *Izumi Hachisu, Mariko Kato, & Ken'ichi Nomoto.* 522, 487 (1999)

STARS: BINARIES: VISUAL

Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28. *M. D. Albrow, J.-P. Beaulieu, J. A. R. Caldwell, M. Dominik, J. Greenhill, K. Hill, S. Kane, R. Martin, J. Menzies, R. M. Naber, J.-W. Pel, K. Pollard, P. D. Sackett, K. C. Sahu, P. Vermaak, R. Watson, A. Williams, (The PLANET Collaboration), & M. S. Sahu.* 522, 1011 (1999)

Sagittarius A* "Visual Binaries": A Direct Measurement of the Galactocentric Distance. *Samir Salim & Andrew Gould.* 523, 633 (1999)

STARS: BLUE STRAGGLERS

Blue Straggler Stars: The Spectacular Population in M80. *Francesco R. Ferraro, Barbara Paltrinieri, Robert T. Rood, & Ben Dorman.* 522, 983 (1999)

The Blue Stragglers in M67 and Single Population Synthesis. *L. Deng, R. Chen, X. S. Liu, & J. S. Chen.* 524, 824 (1999)

STARS: CARBON

Modeling Lithium-rich Carbon Stars in the Large Magellanic Cloud: An Independent Distance Indicator? *Paolo Ventura, Francesca D'Antona, & Italo Mazzitelli.* 524, L111 (1999)

STARS: CHEMICALLY PECULIAR

Toward an Orbit for the High-Luminosity Cepheid T Monocerotis. *Nancy Remage Evans, Kenneth Carpenter, Richard Robinson, Derck Massa, Glenn M. Wahlgren, Jozsef Vinko, & Laszlo Szabados.* 524, 379 (1999)

STARS: CHROMOSPHERES

Two-Component Theoretical Chromosphere Models for K Dwarfs of Different Magnetic Activity: Exploring the Ca II Emission–Stellar Rotation Relationship. *M. Cuntz, W. Rammacher, P. Ulmschneider, Z. E. Musielak, & S. H. Saar.* 522, 1053 (1999)

STARS: CIRCUMSTELLAR MATTER

The [N II] Kinematics of R Aquarii. *J. M. Hollis, S. N. Vogel, D. Van Buren, J. P. Strong, R. G. Lyon, & J. E. Dorband.* 522, 297 (1999)

Dust Formation in the Hot Massive Binary HD 192641 = WR 137 (WC 7+OB). *Sergey V. Marchenko, Anthony F. J. Moffat, & Yves Grosdidier.* 522, 433 (1999)

The Impact of the Massive Young Star GL 2591 on Its Circumstellar Material: Temperature, Density, and Velocity Structure. *Floris F. S. van der Tak, Ewine F. van Dishoeck, Neal J. Evans II, Eric J. Bakker, & Geoffrey A. Blake.* 522, 991 (1999)

Vortices in Protoplanetary Disks. *Patrick Godon & Mario Livio.* 523, 350 (1999)

Bipolar Pre–Planetary Nebulae: Hydrodynamics of Dusty Winds in Binary Systems. II. Morphology of the Circumstellar Envelopes. *Nikos Mastrodemos & Mark Morris.* 523, 357 (1999)

A 1000 AU Rotating Disk around the Massive Young Stellar Object G192.16−3.82. *D. S. Shepherd & S. E. Kurtz.* 523, 690 (1999)

Hubble Space Telescope Space Telescope Imaging Spectrograph Coronagraphic Imaging of the Herbig AE Star AB Aurigae. *C. A. Grady, B. Woodgate, F. C. Bruhweiler, A. Boggess, Philip Plait, Don J. Lindler, M. Clampin, & P. Kalas.* 523, L151 (1999)

An Abundance Analysis of Two Carbon-rich Proto–Planetary Nebulae: IRAS Z02229+6208 and IRAS 07430+1115. *Bacham E. Reddy, Eric J. Bakker, & Bruce J. Hrivnak.* 524, 831 (1999)

The Discovery of Two New Bipolar Proto–Planetary Nebulae: IRAS 16594−4656 and IRAS 17245−3951. *Bruce J. Hrivnak, Sun Kwok, & Kate Y. L. Su.* 524, 849 (1999)

Dust Coagulation in Infalling Protostellar Envelopes. I. Compact Grains. *Gerhard Suttner, Harold W. Yorke, & Doug N. C. Lin.* 524, 857 (1999)

Forming the Dusty Ring in HR 4796A. *Scott J. Kenyon, Kenneth Wood, Barbara A. Whitney, & Michael J. Wolff.* 524, L119 (1999)

Discovery of a Remarkable Point-Symmetric Proto–Planetary Nebula: *Hubble Space Telescope* Imaging of IRAS 04296+3429. *Raghvendra Sahai.* 524, L125 (1999)

STARS: CORONAE

Second-Harmonic Plasma Radiation of Magnetically Trapped Electrons in Stellar Coronae. *A. V. Stepanov, B. Kliem, A. Krüger, J. Hildebrandt, & V. I. Garaimov.* 524, 961 (1999)

On X-Ray Variability in Active Binary Stars. *Vinay Kashyap & Jeremy J. Drake.* 524, 988 (1999)

STARS: DISTANCES

On the Sensitivity of the Cepheid Period-Luminosity Relation to Variations of Metallicity. *Allan Sandage, R. A. Bell, & Michael J. Tripicco.* 522, 250 (1999)

Correlated Errors in *Hipparcos* Parallaxes toward the Pleiades and the Hyades. *Vijay K. Narayanan & Andrew Gould.* 523, 328 (1999)

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Chemical Abundances of OB Stars in the Cepheus OB2 Association. *Simone Daflon, Katia Cunha, & Sylvia R. Becker.* 522, 950 (1999)

Abundances of the Elements in Sharp-lined Early-Type Stars from *IUE* High-Dispersion Spectrograms. II. The Nitrogen Deficiency in Mercury-Manganese Stars. *Scott W. Roby, David S. Leckrone, & Saul J. Adelman.* 524, 974 (1999)

Recurrent X-Ray Emission Variations of η Carinae and the Binary Hypothesis. *K. Ishibashi, M. F. Corcoran, K. Davidson, J. H. Swank, R. Petre, S. A. Drake, A. Damineli, & S. White.* 524, 983 (1999)

STARS: EMISSION-LINE, BE

Spectroscopic Monitoring of the Be/X-Ray Pulsar X Persei/4U 0352+309 with the *ORFEUS*-SPAS II and the *IUE*. *Myron A. Smith & Paul Roche.* 522, 444 (1999)

STARS: EVOLUTION

Mass Limits for Black Hole Formation. *Chris L. Fryer.* 522, 413 (1999)

A Wide Symbiotic Channel to Type Ia Supernovae. *Izumi Hachisu, Mariko Kato, & Ken'ichi Nomoto.* 522, 487 (1999)

The Origin of the Diversity of Type Ia Supernovae and the Environmental Effects. *Hideyuki Umeda, Ken'ichi Nomoto, Chiaki Kobayashi, Izumi Hachisu, & Mariko Kato.* 522, L43 (1999)

Fe II Bubbles in the Young Planetary Nebula Hubble 12. *Charles A. Welch, A. Frank, Judith L. Pipher, W. J. Forrest, & Charles E. Woodward.* 522, L69 (1999)

The Brightest Supergiants Predicted by Theory. *Richard B. Stothers & Chao-wen Chin.* 522, 960 (1999)

Direct Measurement of a Secular Pulsation Period Change in the Pulsating Hot Pre–White Dwarf PG 1159−035. *J. E. S. Costa, S. O. Kepler, & D. E. Winget.* 522, 973 (1999)

Blue Straggler Stars: The Spectacular Population in M80. *Francesco R. Ferraro, Barbara Paltrinieri, Robert T. Rood, & Ben Dorman.* 522, 983 (1999)

The Luminosity Function of M3. *R. T. Rood, E. Carretta, B. Paltrinieri, F. R. Ferraro, F. Fusi-Pecci, B. Dorman, A. Chieffi, O. Straniero, & R. Buonanno.* 523, 752 (1999)

Intermediate-Mass Stars: Updated Models. *Inma Dominguez, Alessandro Chieffi, Marco Limongi, & Oscar Straniero.* 524, 226 (1999)

Hot Horizontal-Branch Stars: The Ubiquitous Nature of the "Jump" in Strömgren u, Low Gravities, and the Role of Radiative Levitation of Metals. *F. Grundahl, M. Catelan, W. B. Landsman, P. B. Stetson, & M. I. Andersen.* 524, 242 (1999)

Modeling Lithium-rich Carbon Stars in the Large Magellanic Cloud: An Independent Distance Indicator? *Paolo Ventura, Francesca D'Antona, & Italo Mazzitelli.* 524, L111 (1999)

An L-Type Substellar Object in Orion: Reaching the Mass Boundary between Brown Dwarfs and Giant Planets. *M. R. Zapatero Osorio, V. J. S. Béjar, R. Rebolo, E. L. Martín, & G. Basri.* 524, L115 (1999)

STARS: FLARE

Detection of Hard X-Rays from a Class I Protostar in the HH 24-26 Region in the Orion Molecular Cloud. *H. Ozawa, F. Nagase, Y. Ueda, T. Dotani, & M. Ishida.* 523, L81 (1999)

Second-Harmonic Plasma Radiation of Magnetically Trapped Electrons in Stellar Coronae. *A. V. Stepanov, B. Kliem, A. Krüger, J. Hildebrandt, & V. I. Garaimov.* 524, 961 (1999)

STARS: FORMATION

Star Formation in the Giant H II Regions of M101. *Jean Giannakopoulou-Creighton, Michel Fich, & Christine D. Wilson.* 522, 238 (1999)

The Kinematics of Stars Emerging from Expanding Shells: An Analysis of the Gould Belt. *Edmundo Moreno, Emilio J. Alfaro, & José Franco.* 522, 276 (1999)

Multipressure Polytropes as Models for the Structure and Stability of Molecular Clouds. I. Theory. *Christopher F. McKee & John H. Holliman II.* 522, 313 (1999)

A Prediction of Brown Dwarfs in Ultracold Molecular Gas. *Bruce G. Elmegreen.* 522, 915 (1999)

The HCO^+ Molecular Outflow in NGC 2071. *José M. Girart, Paul T. P. Ho, Alexander L. Rudolph, Robert Estalella, David J. Wilner, & Lawrence M. Chernin.* 522, 921 (1999)

Vortices in Protoplanetary Disks. *Patrick Godon & Mario Livio.* 523, 350 (1999)

Detection of Hard X-Rays from a Class I Protostar in the HH 24-26 Region in the Orion Molecular Cloud. *H. Ozawa, F. Nagase, Y. Ueda, T. Dotani, & M. Ishida.* 523, L81 (1999)

A 1000 AU Rotating Disk around the Massive Young Stellar Object G192.16−3.82. *D. S. Shepherd & S. E. Kurtz.* 523, 690 (1999)

Criteria for Fragmentation of Rotating Isothermal Clouds Revisited. *Toru Tsuribe & Shu-Ichiro Inutsuka.* 523, L155 (1999)

Driving Outflows from Young Stars through the Effects of Internal Disk Fields. *N. J. Turner, P. Bodenheimer, & M. Rózyczka.* 524, 129 (1999)

Dust Coagulation in Infalling Protostellar Envelopes. I. Compact Grains. *Gerhard Suttner, Harold W. Yorke, & Doug N. C. Lin.* 524, 857 (1999)

Velocity Field Statistics in Star-forming Regions. I. Centroid Velocity Observations. *Mark S. Miesch, John Scalo, & John Bally.* 524, 895 (1999)

Forming the Dusty Ring in HR 4796A. *Scott J. Kenyon, Kenneth Wood, Barbara A. Whitney, & Michael J. Wolff.* 524, L119 (1999)

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Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey. *Adam J. Burgasser, J. Davy Kirkpatrick, Michael E. Brown, I. Neill Reid, John E. Gizis, Conrad C. Dahn, David G. Monet, Charles A. Beichman, James Liebert, Roc M. Cutri, & Michael F. Skrutskie.* 522, L65 (1999)

Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28. *M. D. Albrow, J.-P. Beaulieu, J. A. R. Caldwell, M. Dominik, J. Greenhill, K. Hill, S. Kane, R. Martin, J. Menzies, R. M. Naber, J.-W. Pel, K. Pollard, P. D. Sackett, K. C. Sahu, P. Vermaak, R. Watson, A. Williams, (The PLANET Collaboration), & M. S. Sahu.* 522, 1011 (1999)

Toward an Orbit for the High-Luminosity Cepheid T Monocerotis. *Nancy Remage Evans, Kenneth Carpenter, Richard Robinson, Derck Massa, Glenn M. Wahlgren, Jozsef Vinko, & Laszlo Szabados.* 524, 379 (1999)

A Large Local Rotational Speed for the Galaxy Found from Proper Motions: Implications for the Mass of the Milky Way. *René A. Méndez, Imants Platais, Terrence M. Girard, Vera Kozhurina-Platais, & William F. van Altena.* 524, L39 (1999)

A Very Low Luminosity, Very Cool, DC White Dwarf. *Hugh C. Harris, Conard C. Dahn, Frederick J. Vrba, Arne A. Henden, James Liebert, Gary D. Schmidt, & I. Neill Reid.* 524, 1000 (1999)

STARS: HORIZONTAL-BRANCH

An Abundance Analysis for Five Red Horizontal-Branch Stars in the Extremely Metal-rich Globular Cluster NGC 6553. *Judith G. Cohen, Raffaele G. Gratton, Bradford B. Behr, & Eugenio Carretta.* 523, 739 (1999)

Hot Horizontal-Branch Stars: The Ubiquitous Nature of the "Jump" in Strömgren *u*, Low Gravities, and the Role of Radiative Levitation of Metals. *F. Grundahl, M. Catelan, W. B. Landsman, P. B. Stetson, & M. I. Andersen.* 524, 242 (1999)

STARS: INDIVIDUAL

Constellation Name: υ Andromedae

Analysis of the *Hipparcos* Measurements of υ Andromedae: A Mass Estimate of Its Outermost Known Planetary Companion. *Tsevi Mazeh, Shay Zucker, Andrea Dalla Torre, & Floor van Leeuwen.* 522, L149 (1999)

Constellation Name: R Aquarii

The [N II] Kinematics of R Aquarii. *J. M. Hollis, S. N. Vogel, D. Van Buren, J. P. Strong, R. G. Lyon, & J. E. Dorband.* 522, 297 (1999)

Constellation Name: V1408 Aquilae

On the Enigmatic X-Ray Source V1408 Aquilae (=4U 1957+11). *Michael A. Nowak & Jörn Wilms.* 522, 476 (1999)

Constellation Name: AB Aurigae

Hubble Space Telescope Space Telescope Imaging Spectrograph Coronagraphic Imaging of the Herbig AE Star AB Aurigae. *C. A. Grady, B. Woodgate, F. C. Bruhweiler, A. Boggess, Philip Plait, Don J. Lindler, M. Clampin, & P. Kalas.* 523, L151 (1999)

Constellation Name: τ Bootis

An Upper Limit on the Reflected Light from the Planet Orbiting the Star τ Bootis. *David Charbonneau, Robert W. Noyes, Sylvain G. Korzennik, Peter Nihenson, Saurabh Jha, Steven S. Vogt, & Robert I. Kibrick.* 522, L145 (1999)

Constellation Name: η Carinae

Recurrent X-Ray Emission Variations of η Carinae and the Binary Hypothesis. *K. Ishibashi, M. F. Corcoran, K. Davidson, J. H. Swank, R. Petre, S. A. Drake, A. Damineli, & S. White.* 524, 983 (1999)

Constellation Name: ρ Cassiopeiae

The Yellow Hypergiants HR 8752 and ρ Cassiopeiae near the Evolutionary Border of Instability. *G. Israelian, A. Lobel, & M. R. Schmidt.* 523, L145 (1999)

Constellation Name: Circinus X-1

Scattering and Iron Fluorescence Revealed during Absorption Dips in Circinus X-1. *Robert E. Shirey, Alan M. Levine, & Hale V. Bradt.* 524, 1048 (1999)

Constellation Name: T Monocerotis

Toward an Orbit for the High-Luminosity Cepheid T Monocerotis. *Nancy Remage Evans, Kenneth Carpenter, Richard Robinson, Derck Massa, Glenn M. Wahlgren, Jozsef Vinko, & Laszlo Szabados.* 524, 379 (1999)

Constellation Name: IP Pegasi

The Quiescent Accretion Disk in IP Pegasi at Near-Infrared Wavelengths. *C. S. Froning, E. L. Robinson, William F. Welsh, & Janet H. Wood.* 523, 399 (1999)

Constellation Name: X Persei

Spectroscopic Monitoring of the Be/X-Ray Pulsar X Persei/4U 0352+309 with the *ORFEUS*-SPAS II and the *IUE*. *Myron A. Smith & Paul Roche.* 522, 444 (1999)

Constellation Name: V347 Puppis

The Eclipsing Cataclysmic Variable V347 Puppis Revisited. *Marcos P. Diaz & Hubeny Ivan.* 523, 786 (1999)

Constellation Name: Scorpius X-1

Interpretation of ∼35 Hz QPO in the Atoll Source 4U 1702−42 as a Low Branch of the Keplerian Oscillations under the Influence of the Coriolis Force. *Vladimir Osherovich & Lev Titarchuk.* 523, L73 (1999)

Constellation Name: U Scorpii

First Direct Measurement of Acceleration in the Outflow of a Nova: U Scorpii (1999). *Sébastien Lépine, Michael M. Shara, Mario Livio, & David Zurek.* 522, L121 (1999)

Constellation Name: T Tauri

A Deep Long-Slit Spectroscopic Study of the Two Bipolar Outflows from the T Tauri Binary System. *J. Solf & K.-H. Bohm.* 523, 709 (1999)

Bright Star Number: HR 4796A

Forming the Dusty Ring in HR 4796A. *Scott J. Kenyon, Kenneth Wood, Barbara A. Whitney, & Michael J. Wolff.* 524, L119 (1999)

Bright Star Number: HR 8752

The Yellow Hypergiants HR 8752 and ρ Cassiopeiae near the Evolutionary Border of Instability. *G. Israelian, A. Lobel, & M. R. Schmidt.* 523, L145 (1999)

Henry Draper Number: HD 192641

Dust Formation in the Hot Massive Binary HD 192641 = WR 137 (WC 7+OB). *Sergey V. Marchenko, Anthony F. J. Moffat, & Yves Grosdidier.* 522, 433 (1999)

Alphanumeric: AFGL 2591

The Impact of the Massive Young Star GL 2591 on Its Circumstellar Material: Temperature, Density, and Velocity Structure. *Floris F. S. van der Tak, Ewine F. van Dishoeck, Neal J. Evans II, Eric J. Bakker, & Geoffrey A. Blake.* 522, 991 (1999)

Alphanumeric: 2CG 135−01

Discovery of a Hard X-Ray Source, SAX J0635+0533, in the Error Box of the Gamma-Ray Source 2EG 0635+0521. *Philip Kaaret, Santina Piraino, Jules Halpern, & Michael Eracleous.* 523, 197 (1999)

Alphanumeric: 1E 1841−045

On the Spin History of the X-Ray Pulsar in Kes 73: Further Evidence for an Ultramagnetized Neutron Star. *E. V. Gotthelf, G. Vasisht, & T. Dotani.* 522, L49 (1999)

Alphanumeric: 2EG J0635−0521

Discovery of a Hard X-Ray Source, SAX J0635+0533, in the Error Box of the Gamma-Ray Source 2EG 0635+0521. *Philip Kaaret, Santina Piraino, Jules Halpern, & Michael Eracleous.* 523, 197 (1999)

Alphanumeric: GRO J1655−40

RXTE Observations of 0.1–300 Hz Quasi-periodic Oscillations in the Microquasar GRO J1655−40. *Ronald A. Remillard, Edward H. Morgan, Jeffrey E. McClintock, Charles D. Bailyn, & Jerome A. Orosz.* 522, 397 (1999)

Alphanumeric: GRS 1915+105

Phase Lags of Quasi-periodic Oscillations in Microquasar GRS 1915+105. *Wei Cui.* 524, L59 (1999)

Alphanumeric: GX 17+2

Infrared Candidates for the Intense Galactic X-Ray Source GX 17+2. *Eric W. Deutsch, Bruce Margon, Scott F. Anderson, Stefanie Wachter, & W. M. Goss.* 524, 406 (1999)

Alphanumeric: GX 339−4

Low-Luminosity States of the Black Hole Candidate GX 339−4. I. *ASCA* and Simultaneous Radio/*RXTE* Observations. *Jörn Wilms, Michael A. Nowak, James B. Dove, Robert P. Fender, & Tiziana Di Matteo.* 522, 460 (1999)

Alphanumeric: Kes 73

On the Spin History of the X-Ray Pulsar in Kes 73: Further Evidence for an Ultramagnetized Neutron Star. *E. V. Gotthelf, G. Vasisht, & T. Dotani.* 522, L49 (1999)

Alphanumeric: LHS 3250

A Very Low Luminosity, Very Cool, DC White Dwarf. *Hugh C. Harris, Conard C. Dahn, Frederick J. Vrba, Arne A. Henden, James Liebert, Gary D. Schmidt, & I. Neill Reid.* 524, 1000 (1999)

Alphanumeric: LS I +61°303

Discovery of a Hard X-Ray Source, SAX J0635+0533, in the Error Box of the Gamma-Ray Source 2EG 0635+0521. *Philip Kaaret, Santina Piraino, Jules Halpern, & Michael Eracleous.* 523, 197 (1999)

Alphanumeric: 2MASSI J1047539+212423

Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey. *Adam J. Burgasser, J. Davy Kirkpatrick, Michael E. Brown, I. Neill Reid, John E. Gizis, Conrad C. Dahn, David G. Monet, Charles A. Beichman, James Liebert, Roc M. Cutri, & Michael F. Skrutskie.* 522, L65 (1999)

Alphanumeric: 2MASSW J1217111−031113

Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey. *Adam J. Burgasser, J. Davy Kirkpatrick, Michael E. Brown, I. Neill Reid, John E. Gizis, Conrad C. Dahn, David G. Monet, Charles A. Beichman, James Liebert, Roc M. Cutri, & Michael F. Skrutskie.* 522, L65 (1999)

Alphanumeric: 2MASSW J1225543−273947

Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey. *Adam J. Burgasser, J. Davy Kirkpatrick, Michael E. Brown, I. Neill Reid, John E. Gizis, Conrad C. Dahn, David G. Monet, Charles A. Beichman, James Liebert, Roc M. Cutri, & Michael F. Skrutskie.* 522, L65 (1999)

Alphanumeric: 2MASSW J1237392+652615

Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey. *Adam J. Burgasser, J. Davy Kirkpatrick, Michael E. Brown, I. Neill Reid, John E. Gizis, Conrad C. Dahn, David G. Monet, Charles A. Beichman, James Liebert, Roc M. Cutri, & Michael F. Skrutskie.* 522, L65 (1999)

Alphanumeric: 2MASSW J1346464−003150

Discovery of Four Field Methane (T-Type) Dwarfs with the Two Micron All-Sky Survey. *Adam J. Burgasser, J. Davy Kirkpatrick, Michael E. Brown, I. Neill Reid, John E. Gizis, Conrad C. Dahn, David G. Monet, Charles A. Beichman, James Liebert, Roc M. Cutri, & Michael F. Skrutskie.* 522, L65 (1999)

Alphanumeric: PG 1159−035

Direct Measurement of a Secular Pulsation Period Change in the Pulsating Hot Pre–White Dwarf PG 1159−035. *J. E. S. Costa, S. O. Kepler, & D. E. Winget.* 522, 973 (1999)

Alphanumeric: PSR J1259−63

Discovery of a Hard X-Ray Source, SAX J0635+0533, in the Error Box of the Gamma-Ray Source 2EG 0635+0521. *Philip Kaaret, Santina Piraino, Jules Halpern, & Michael Eracleous.* 523, 197 (1999)

Alphanumeric: RX J005245.0−263449

ROSAT HRI X-Ray Observations of the Open Globular Cluster NGC 288. *Craig L. Sarazin, Jimmy A. Irwin, Robert T. Rood, Francesco R. Ferraro, & Barbara Paltrinieri.* 524, 220 (1999)

Alphanumeric: SAX J0635+0533

Discovery of a Hard X-Ray Source, SAX J0635+0533, in the Error Box of the Gamma-Ray Source 2EG 0635+0521. *Philip Kaaret, Santina Piraino, Jules Halpern, & Michael Eracleous.* 523, 197 (1999)

Alphanumeric: SAX J1750.8−2900

A New Bursting X-Ray Transient: SAX J1750.8−2900. *L. Natalucci, R. Cornelisse, A. Bazzano, M. Cocchi, P. Ubertini, J. Heise, J. J. M. in 't Zand, & E. Kuulkers.* 523, L45 (1999)

Alphanumeric: SGR 1900+14

Variable Spin-down in the Soft Gamma Repeater SGR 1900+14 and Correlations with Burst Activity. *Peter M. Woods, Chryssa Kouveliotou, Jan van Paradijs, Mark H. Finger, Christopher Thompson, Robert C. Duncan, Kevin Hurley, Tod Strohmayer, Jean Swank, & Toshio Murakami.* 524, L55 (1999)

Alphanumeric: SSV 61

Detection of Hard X-Rays from a Class I Protostar in the HH 24-26 Region in the Orion Molecular Cloud. *H. Ozawa, F. Nagase, Y. Ueda, T. Dotani, & M. Ishida.* 523, L81 (1999)

Alphanumeric: SSV 63E

Detection of Hard X-Rays from a Class I Protostar in the HH 24-26 Region in the Orion Molecular Cloud. *H. Ozawa, F. Nagase, Y. Ueda, T. Dotani, & M. Ishida.* 523, L81 (1999)

Alphanumeric: SSV 63W

Detection of Hard X-Rays from a Class I Protostar in the HH 24-26 Region in the Orion Molecular Cloud. *H. Ozawa, F. Nagase, Y. Ueda, T. Dotani, & M. Ishida.* 523, L81 (1999)

Alphanumeric: 4U 1636−53

Spin-down of Pulsations in the Cooling Tail of an X-Ray Burst from 4U 1636−53. *Tod E. Strohmayer.* 523, L51 (1999)

Alphanumeric: 4U 1702−42

Interpretation of ∼35 Hz QPO in the Atoll Source 4U 1702−42 as a Low Branch of the Keplerian Oscillations under the Influence of the Coriolis Force. *Vladimir Osherovich & Lev Titarchuk.* 523, L73 (1999)

Alphanumeric: WR 137

Dust Formation in the Hot Massive Binary HD 192641 = WR 137 (WC 7+OB). *Sergey V. Marchenko, Anthony F. J. Moffat, & Yves Grosdidier.* 522, 433 (1999)

Alphanumeric: WR 147

Simultaneous Radio and X-Ray Observations of the Wolf-Rayet Star WR 147. *Stephen L. Skinner, Masayuki Itoh, Fumiaki Nagase, & Svetozar A. Zhekov.* 524, 394 (1999)

Alphanumeric: XTE J1806−246

The Discovery of a 7–14 Hz Quasi-periodic Oscillation in the X-Ray Transient XTE J1806−246. *Rudy Wijnands & Michiel van der Klis.* 522, 965 (1999)

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The Role of Kinetic Energy Flux in the Convective Urca Process. *J. Stein, Z. Barkat, & J. C. Wheeler.* 523, 381 (1999)

Gravity Modes in ZZ Ceti Stars. III. Effects of Turbulent Dissipation. *Peter Goldreich & Yanqin Wu.* 523, 805 (1999)

Intermediate-Mass Stars: Updated Models. *Inma Dominguez, Alessandro Chieffi, Marco Limongi, & Oscar Straniero.* 524, 226 (1999)

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STARS: KINEMATICS

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A Large Local Rotational Speed for the Galaxy Found from Proper Motions: Implications for the Mass of the Milky Way. *René A. Méndez, Imants Platais, Terrence M. Girard, Vera Kozhurina-Platais, & William F. van Altena.* 524, L39 (1999)

Evidence for a Population of Numerous Binaries with Comparably Bright Components among *Hipparcos* "Single" F Stars. *A. A. Suchkov & M. McMaster.* 524, L99 (1999)

STARS: LATE-TYPE

Limb Darkening of a K Giant in the Galactic Bulge: PLANET Photometry of MACHO 97-BLG-28. *M. D. Albrow, J.-P. Beaulieu, J. A. R. Caldwell, M. Dominik, J. Greenhill, K. Hill, S. Kane, R. Martin, J. Menzies, R. M. Naber, J.-W. Pel, K. Pollard, P. D. Sackett, K. C. Sahu, P. Vermaak, R. Watson, A. Williams, (The PLANET Collaboration), & M. S. Sahu.* 522, 1011 (1999)

Two-Component Theoretical Chromosphere Models for K Dwarfs of Different Magnetic Activity: Exploring the Ca II Emission–Stellar Rotation Relationship. *M. Cuntz, W. Rammacher, P. Ulmschneider, Z. E. Musielak, & S. H. Saar.* 522, 1053 (1999)

The Luminosity Function of M3. *R. T. Rood, E. Carretta, B. Paltrinieri, F. R. Ferraro, F. Fusi-Pecci, B. Dorman, A. Chieffi, O. Straniero, & R. Buonanno.* 523, 752 (1999)

The Yellow Hypergiants HR 8752 and ρ Cassiopeiae near the Evolutionary Border of Instability. *G. Israelian, A. Lobel, & M. R. Schmidt.* 523, L145 (1999)

Time Evolution of the Magnetic Activity Cycle Period. II. Results for an Expanded Stellar Sample. *Steven H. Saar & Axel Brandenburg.* 524, 295 (1999)

STARS: LOW-MASS, BROWN DWARFS

The Lithium-Depletion Boundary and the Age of the Young Open Cluster IC 2391. *David Barrado y Navascués, John R. Stauffer, & Brian M. Patten.* 522, L53 (1999)

The Discovery of a Field Methane Dwarf from Sloan Digital Sky Survey Commissioning Data. *Michael A. Strauss, Xiaohui Fan, James E. Gunn, S. K. Leggett, T. R. Geballe, Jeffrey R. Pier, Robert H. Lupton, G. R. Knapp, James Annis, J. Brinkmann, J. H. Crocker, István Csabai, Masataka Fukugita, David A. Golimowski, Frederick H. Harris, G. S. Henessey, Robert S. Hindsley, Željko Ivezić, Stephen Kent, D. Q. Lamb, Jeffrey A. Munn, Heidi Jo Newberg, Ron Rechenmacher, Donald P. Schneider, J. Allyn Smith, Chris Stoughton, Douglas L. Tucker, Patrick Waddell, & Donald G. York.* 522, L61 (1999)

A Prediction of Brown Dwarfs in Ultracold Molecular Gas. *Bruce G. Elmegreen.* 522, 915 (1999)

Observations of the Binary Microlens Event MACHO 98-SMC-1 by the Microlensing Planet Search Collaboration. *S. H. Rhie, A. C. Becker, D. P. Bennett, P. C. Fragile, B. R. Johnson, L. J. King, B. A. Peterson, J. Quinn, & (The Microlensing Planet Search Collaboration.* 522, 1037 (1999)

Newly Discovered Brown Dwarfs Not Seen in Microlensing Timescale Frequency Distribution? *S. J. Peale.* 524, L67 (1999)

An L-Type Substellar Object in Orion: Reaching the Mass Boundary between Brown Dwarfs and Giant Planets. *M. R. Zapatero Osorio, V. J. S. Béjar, R. Rebolo, E. L. Martín, & G. Basri.* 524, L115 (1999)

STARS: LUMINOSITY FUNCTION, MASS FUNCTION

A Prediction of Brown Dwarfs in Ultracold Molecular Gas. *Bruce G. Elmegreen.* 522, 915 (1999)

The Luminosity Function of M3. *R. T. Rood, E. Carretta, B. Paltrinieri, F. R. Ferraro, F. Fusi-Pecci, B. Dorman, A. Chieffi, O. Straniero, & R. Buonanno.* 523, 752 (1999)

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Jets from Accreting Magnetic Young Stellar Objects. II. Mechanism Physics. *Anthony P. Goodson & Robert M. Winglee.* 524, 159 (1999)

Time Evolution of the Magnetic Activity Cycle Period. II. Results for an Expanded Stellar Sample. *Steven H. Saar & Axel Brandenburg.* 524, 295 (1999)

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Discovery of a Remarkable Point-Symmetric Proto–Planetary Nebula: *Hubble Space Telescope* Imaging of IRAS 04296+3429. *Raghvendra Sahai.* 524, L125 (1999)

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Polarimetric Properties of the Crab Pulsar between 1.4 and 8.4 GHz. *David A. Moffett & Timothy H. Hankins.* 522, 1046 (1999)

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Transient Radio Emission from SAX J1808.4−3658. *B. M. Gaensler, B. W. Stappers, & T. J. Getts.* 522, L117 (1999)

Discovery of a Hard X-Ray Source, SAX J0635+0533, in the Error Box of the Gamma-Ray Source 2EG 0635+0521. *Philip Kaaret, Santina Piraino, Jules Halpern, & Michael Eracleous.* 523, 197 (1999)

Where Is SGR 1806−20? *K. Hurley, C. Kouveliotou, T. Cline, E. Mazets, S. Golenetskii, D. D. Frederiks, & J. van Paradijs.* 523, L37 (1999)

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A New Bursting X-Ray Transient: SAX J1750.8−2900. *L. Natalucci, R. Cornelisse, A. Bazzano, M. Cocchi, P. Ubertini, J. Heise, J. J. M. in 't Zand, & E. Kuulkers.* 523, L45 (1999)

Spin-down of Pulsations in the Cooling Tail of an X-Ray Burst from 4U 1636−53. *Tod E. Strohmayer.* 523, L51 (1999)

Interpretation of ~35 Hz QPO in the Atoll Source 4U 1702−42 as a Low Branch of the Keplerian Oscillations under the Influence of the Coriolis Force. *Vladimir Osherovich & Lev Titarchuk.* 523, L73 (1999)

Constraining the Cosmic Abundance of Stellar Remnants with Multi-TeV Gamma Rays. *David S. Graff, Katherine Freese, Terry P. Walker, & Marc H. Pinsonneault.* 523, L77 (1999)

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T. Oosterbroek, T. Bulik, T. Mihara, S. Campana, G. L. Israel, & L. Stella. 523, L85 (1999)

Precession of Isolated Neutron Stars. I. Effects of Imperfect Pinning. *Armen Sedrakian, Ira Wasserman, & James M. Cordes.* 524, 341 (1999)

Magnetized Accreting Stars: Studies of the Inner Accretion-Disk Edge by a Magnetohydrodynamic Approach. II. Ideal Instabilities of the Inner Disk Edge. *Lutz Rastätter & Karl Schindler.* 524, 361 (1999)

Correlations in the Quasi-periodic Oscillation Frequencies of Low-Mass X-Ray Binaries and the Relativistic Precession Model. *Luigi Stella, Mario Vietri, & Sharon M. Morsink.* 524, L63 (1999)

Resonant Cyclotron Radiation Transfer Model Fits to Spectra from Gamma-Ray Burst GRB 870303. *P. E. Freeman, D. Q. Lamb, J. C. L. Wang, I. Wasserman, T. J. Loredo, E. E. Fenimore, T. Murakami, & A. Yoshida.* 524, 772 (1999)

The Rapid Proton Process Ashes from Stable Nuclear Burning on an Accreting Neutron Star. *Hendrik Schatz, Lars Bildsten, Andrew Cumming, & Michael Wiescher.* 524, 1014 (1999)

Magnetically Driven Warping, Precession, and Resonances in Accretion Disks. *Dong Lai.* 524, 1030 (1999)

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First Direct Measurement of Acceleration in the Outflow of a Nova: U Scorpii (1999). *Sébastien Lépine, Michael M. Shara, Mario Livio, & David Zurek.* 522, L121 (1999)

The Quiescent Accretion Disk in IP Pegasi at Near-Infrared Wavelengths. *C. S. Froning, E. L. Robinson, William F. Welsh, & Janet H. Wood.* 523, 399 (1999)

Nucleosynthesis on ONeMg Novae: Models versus Observations to Constrain the Masses of ONeMg White Dwarfs and Their Envelopes. *Shinya Wanajo, Masa-aki Hashimoto, & Ken'ichi Nomoto.* 523, 409 (1999)

The Eclipsing Cataclysmic Variable V347 Puppis Revisited. *Marcos P. Diaz & Hubeny Ivan.* 523, 786 (1999)

Time Evolution of the Magnetic Activity Cycle Period. II. Results for an Expanded Stellar Sample. *Steven H. Saar & Axel Brandenburg.* 524, 295 (1999)

Explosive Hydrogen Burning of ^{27}Si, ^{31}S, ^{35}Ar, and ^{39}Ca in Novae and X-Ray Bursts. *Christian Iliadis, Pieter M. Endt, Nikos Prantzos, & William J. Thompson.* 524, 434 (1999)

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RXTE Observations of 0.1–300 Hz Quasi-periodic Oscillations in the Microquasar GRO J1655−40. *Ronald A. Remillard, Edward H. Morgan, Jeffrey E. McClintock, Charles D. Bailyn, & Jerome A. Orosz.* 522, 397 (1999)

The Brightest Supergiants Predicted by Theory. *Richard B. Stothers & Chao-wen Chin.* 522, 960 (1999)

The Discovery of a 7–14 Hz Quasi-periodic Oscillation in the X-Ray Transient XTE J1806−246. *Rudy Wijnands & Michiel van der Klis.* 522, 965 (1999)

Direct Measurement of a Secular Pulsation Period Change in the Pulsating Hot Pre–White Dwarf PG 1159−035. *J. E. S. Costa, S. O. Kepler, & D. E. Winget.* 522, 973 (1999)

Gravity Modes in ZZ Ceti Stars. III. Effects of Turbulent Dissipation. *Peter Goldreich & Yanqin Wu.* 523, 805 (1999)

Phase Lags of Quasi-periodic Oscillations in Microquasar GRS 1915+105. *Wei Cui.* 524, L59 (1999)

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Abundances of the Elements in Sharp-lined Early-Type Stars from *IUE* High-Dispersion Spectrograms. II. The Nitrogen Deficiency in Mercury-Manganese Stars. *Scott W. Roby, David S. Leckrone, & Saul J. Adelman.* 524, 974 (1999)

STARS: PLANETARY SYSTEMS

Astrometric Microlensing as a Method of Discovering and Characterizing Extrasolar Planets. *Neda Safizadeh, Neal Dalal, & Kim Griest.* 522, 512 (1999)

An Upper Limit on the Reflected Light from the Planet Orbiting the Star τ Bootis. *David Charbonneau, Robert W. Noyes, Sylvain G. Korzennik, Peter Nihenson, Saurabh Jha, Steven S. Vogt, & Robert I. Kibrick.* 522, L145 (1999)

Analysis of the *Hipparcos* Measurements of υ Andromedae: A Mass Estimate of Its Outermost Known Planetary Companion. *Tsevi Mazeh, Shay Zucker, Andrea Dalla Torre, & Floor van Leeuwen.* 522, L149 (1999)

Vortices in Protoplanetary Disks. *Patrick Godon & Mario Livio.* 523, 350 (1999)

The Triple Pulsar System PSR B1620−26 in M4. *S. E. Thorsett, Z. Arzoumanian, F. Camilo, & A. G. Lyne.* 523, 763 (1999)

Hubble Space Telescope Space Telescope Imaging Spectrograph Coronagraphic Imaging of the Herbig AE Star AB Aurigae. *C. A. Grady, B. Woodgate, F. C. Bruhweiler, A. Boggess, Philip Plait, Don J. Lindler, M. Clampin, & P. Kalas.* 523, L151 (1999)

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Rubidium in Metal-deficient Disk and Halo Stars. *Jocelyn Tomkin & David L. Lambert.* 523, 234 (1999)

The Spite Lithium Plateau: Ultrathin but Postprimordial. *Sean G. Ryan, John E. Norris, & Timothy C. Beers.* 523, 654 (1999)

Lithium Isotope Ratios in Halo Stars. III. *L. M. Hobbs, J. A. Thorburn, & L. M. Rebull.* 523, 797 (1999)

Hot Horizontal-Branch Stars: The Ubiquitous Nature of the "Jump" in Strömgren u, Low Gravities, and the Role of Radiative Levitation of Metals. *F. Grundahl, M. Catelan, W. B. Landsman, P. B. Stetson, & M. I. Andersen.* 524, 242 (1999)

STARS: PRE–MAIN-SEQUENCE

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The Impact of the Massive Young Star GL 2591 on Its Circumstellar Material: Temperature, Density, and Velocity Structure. *Floris F. S. van der Tak, Ewine F. van Dishoeck, Neal J. Evans II, Eric J. Bakker, & Geoffrey A. Blake.* 522, 991 (1999)

Vortices in Protoplanetary Disks. *Patrick Godon & Mario Livio.* 523, 350 (1999)

Detection of Hard X-Rays from a Class I Protostar in the HH 24-26 Region in the Orion Molecular Cloud. *H. Ozawa, F. Nagase, Y. Ueda, T. Dotani, & M. Ishida.* 523, L81 (1999)

A Deep Long-Slit Spectroscopic Study of the Two Bipolar Outflows from the T Tauri Binary System. *J. Solf & K.-H. Bohm.* 523, 709 (1999)

Hubble Space Telescope Space Telescope Imaging Spectrograph Coronagraphic Imaging of the Herbig AE Star AB Aurigae. *C. A. Grady, B. Woodgate, F. C. Bruhweiler, A. Boggess, Philip Plait, Don J. Lindler, M. Clampin, & P. Kalas.* 523, L151 (1999)

Jets from Accreting Magnetic Young Stellar Objects. I. Comparison of Observations and High-Resolution Simulation Results. *Anthony P. Goodson, Karl-Heinz Böhm, & Robert M. Winglee.* 524, 142 (1999)

Jets from Accreting Magnetic Young Stellar Objects. II. Mechanism Physics. *Anthony P. Goodson & Robert M. Winglee.* 524, 159 (1999)

Ambipolar Diffusion in Young Stellar Object Jets. *Adam Frank, Thomas A. Gardiner, Guy Delemarter, Thibaut Lery, & Riccardo Betti.* 524, 947 (1999)

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Constraints on Natal Pulsar Kicks from Eccentric Binary Pulsars. *A. Hughes & M. Bailes.* 522, 504 (1999)

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Discovery of a Hard X-Ray Source, SAX J0635+0533, in the Error Box of the Gamma-Ray Source 2EG 0635+0521. *Philip Kaaret, Santina Piraino, Jules Halpern, & Michael Eracleous.* 523, 197 (1999)

Beams and Cones from Aligned Rotators. *B. J. Eastlund & B. Miller.* 523, L41 (1999)

Spin-down of the 65 Millisecond X-Ray Pulsar in the Supernova Remnant G11.2−0.3. *Ken'ichi Torii, Hiroshi Tsunemi, Tadayasu Dotani, Kazuhisa Mitsuda, Nobuyuki Kawai, Kenzo Kinugasa, Yoshitaka Saito, & Shinpei Shibata.* 523, L69 (1999)

Post-Newtonian Theory for Precision Doppler Measurements of Binary Star Orbits. *S. M. Kopeikin & L. M. Ozernoy.* 523, 771 (1999)

Parallax of PSR J1744−1134 and the Local Interstellar Medium. *M. Toscano, M. C. Britton, R. N. Manchester, M. Bailes, J. S. Sandhu, S. R. Kulkarni, & S. B. Anderson.* 523, L171 (1999)

Magnetized Accreting Stars: Studies of the Inner Accretion-Disk Edge by a Magnetohydrodynamic Approach. II. Ideal Instabilities of the Inner Disk Edge. *Lutz Rastätter & Karl Schindler.* 524, 361 (1999)

Variable Spin-down in the Soft Gamma Repeater SGR 1900+14 and Correlations with Burst Activity. *Peter M. Woods, Chryssa Kouveliotou, Jan van Paradijs, Mark H. Finger, Christopher Thompson, Robert C. Duncan, Kevin Hurley, Tod Strohmayer, Jean Swank, & Toshio Murakami.* 524, L55 (1999)

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Jet-induced Explosions of Core Collapse Supernovae. *A. M. Khokhlov, P. A. Höflich, E. S. Oran, J. C. Wheeler, L. Wang, & A. Yu. Chtchelkanova.* 524, L107 (1999)

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Name: Crab Pulsar

A Search for Pulse-to-Pulse Variability of the Crab Pulsar. *Brian L. Patt, M. P. Ulmer, William Zhang, James M. Cordes, & Z. Arzoumanian.* 522, 440 (1999)

Name: Vela pulsar

A *Rossi X-Ray Timing Explorer* Observation of the Vela Pulsar: Filling in the X-Ray Gap. *M. S. Strickman, A. K. Harding, & O. C. de Jager.* 524, 373 (1999)

Alphanumeric: AX J170006−4157

Discovery of 715 Second Pulsations from the Faint X-Ray Source AX J170006−4157. *Ken'ichi Torii, Mutsumi Sugizaki, Takayoshi Kohmura, Takao Endo, & Fumiaki Nagase.* 523, L65 (1999)

Alphanumeric: AX J1811.5−1926

Spin-down of the 65 Millisecond X-Ray Pulsar in the Supernova Remnant G11.2−0.3. *Ken'ichi Torii, Hiroshi Tsunemi, Tadayasu Dotani, Kazuhisa Mitsuda, Nobuyuki Kawai, Kenzo Kinugasa, Yoshitaka Saito, & Shinpei Shibata.* 523, L69 (1999)

Alphanumeric: B0943+10

Pulsar Magnetospheric Emission Mapping: Images and Implications of Polar Cap Weather. *Avinash A. Deshpande & Joanna M. Rankin.* 524, 1008 (1999)

Alphanumeric: PSR 0943+10

PSR 0943+10: A Bare Strange Star? *R. X. Xu, G. J. Qiao, & Bing Zhang.* 522, L109 (1999)

Alphanumeric: PSR B0531+21

Polarimetric Properties of the Crab Pulsar between 1.4 and 8.4 GHz. *David A. Moffett & Timothy H. Hankins.* 522, 1046 (1999)

Alphanumeric: PSR B1620−26

The Triple Pulsar System PSR B1620−26 in M4. *S. E. Thorsett, Z. Arzoumanian, F. Camilo, & A. G. Lyne.* 523, 763 (1999)

Alphanumeric: PSR J1744−1134

Parallax of PSR J1744−1134 and the Local Interstellar Medium. *M. Toscano, M. C. Britton, R. N. Manchester, M. Bailes, J. S. Sandhu, S. R. Kulkarni, & S. B. Anderson.* 523, L171 (1999)

Alphanumeric: SAX J1808.4−3658

Transient Radio Emission from SAX J1808.4−3658. *B. M. Gaensler, B. W. Stappers, & T. J. Getts.* 522, L117 (1999)

Alphanumeric: 4U 0352+309

Spectroscopic Monitoring of the Be/X-Ray Pulsar X Persei/4U 0352+309 with the *ORFEUS*-SPAS II and the *IUE*. *Myron A. Smith & Paul Roche.* 522, 444 (1999)

Alphanumeric: X0115+634

A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features. *A. Santangelo, A. Segreto, S. Giarrusso, D. Dal Fiume, M. Orlandini, A. N. Parmar, T. Oosterbroek, T. Bulik, T. Mihara, S. Campana, G. L. Israel, & L. Stella.* 523, L85 (1999)

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Spin-down of Pulsations in the Cooling Tail of an X-Ray Burst from 4U 1636−53. *Tod E. Strohmayer.* 523, L51 (1999)

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The Role of Kinetic Energy Flux in the Convective Urca Process. *J. Stein, Z. Barkat, & J. C. Wheeler.* 523, 381 (1999)

Can Deflagration-Detonation Transitions Occur in Type Ia Supernovae? *J. C. Niemeyer.* 523, L57 (1999)

Constraints on the Time Delay between Nucleosynthesis and Cosmic-Ray Acceleration from Observations of Ni and Co. *M. E. Wiedenbeck, W. R. Binns, E. R. Christian, A. C. Cummings, B. L. Dougherty, P. L. Hink, J. Klarmann, R. A. Leske, M. Lijowski, R. A. Mewaldt, E. C. Stone, M. R. Thayer, T. T. von Rosenvinge, & N. E. Yanasak.* 523, L61 (1999)

Probing *r*-Process Production of Nuclei beyond ^{209}Bi with Gamma Rays. *Y.-Z. Qian, P. Vogel, & G. J. Wasserburg.* 524, 213 (1999)

Collapsars: Gamma-Ray Bursts and Explosions in "Failed Supernovae." *A. I. MacFadyen & S. E. Woosley.* 524, 262 (1999)

Small-Scale Interaction of Turbulence with Thermonuclear Flames in Type Ia Supernovae. *J. C. Niemeyer, W. K. Bushe, & G. R. Ruetsch.* 524, 290 (1999)

Jet-induced Explosions of Core Collapse Supernovae. *A. M. Khokhlov, P. A. Höflich, E. S. Oran, J. C. Wheeler, L. Wang, & A. Yu. Chtchelkanova.* 524, L107 (1999)

STARS: SUPERNOVAE: INDIVIDUAL

Alphanumeric: G11.2−0.3

Spin-down of the 65 Millisecond X-Ray Pulsar in the Supernova Remnant G11.2−0.3. *Ken'ichi Torii, Hiroshi Tsunemi, Tadayasu Dotani, Kazuhisa Mitsuda, Nobuyuki Kawai, Kenzo Kinugasa, Yoshitaka Saito, & Shinpei Shibata.* 523, L69 (1999)

Alphanumeric: SN 1987A

Beams and Cones from Aligned Rotators. *B. J. Eastlund & B. Miller.* 523, L41 (1999)

A Possible Lateral Gamma-Ray Burst Jet from SN 1987A. *Renyue Cen.* 524, L51 (1999)

Alphanumeric: SN 1989B

Cepheid Calibration of the Peak Brightness of Type Ia Supernovae. IX. SN 1989B in NGC 3627. *A. Saha, Allan Sandage, G. A. Tammann, Lukas Labhardt, F. D. Macchetto, & N. Panagia.* 522, 802 (1999)

Alphanumeric: SN 1991T

Evolution of the Light Echo of SN 1991T. *W. B. Sparks, F. Macchetto, N. Panagia, F. R. Boffi, D. Branch, M. L. Hazen, & M. Della Valle.* 523, 585 (1999)

Alphanumeric: SN 1998bw

Off-Axis Emission from the Beamed Afterglow of Gamma-Ray Bursts and a Possible Interpretation of the Slowly Declining X-Ray Afterglow of GRB 980425. *Takashi Nakamura.* 522, L101 (1999)

Jet-induced Explosions of Core Collapse Supernovae. *A. M. Khokhlov, P. A. Höflich, E. S. Oran, J. C. Wheeler, L. Wang, & A. Yu. Chtchelkanova.* 524, L107 (1999)

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A Cepheid Distance to NGC 4603 in Centaurus. *Jeffrey A. Newman, Stephen E. Zepf, Marc Davis, Wendy L. Freedman, Barry F. Madore, Peter B. Stetson, N. Silbermann, & Randy Phelps.* 523, 506 (1999)

The *Hubble Space Telescope* Extragalactic Distance Scale Key Project. XXIII. The Discovery of Cepheids in NGC 3319. *Shoko Sakai, Laura Ferrarese, Robert C. Kennicutt, John A. Graham, N. A. Silbermann, Jeremy R. Mould, Wendy L. Freedman, Fabio Bresolin, Holland C. Ford, Brad K. Gibson, Mingsheng Han, Paul Harding, John G. Hoessel, John P. Huchra, Shaun M. Hughes, Garth D. Illingworth, Daniel Kelson, Lucas Macri, Barry F. Madore, Randy L. Phelps, Abhijit Saha, Kim M. Sebo, Peter B. Stetson, & Anne Turner.* 523, 540 (1999)

Toward an Orbit for the High-Luminosity Cepheid T Monocerotis. *Nancy Remage Evans, Kenneth Carpenter, Richard Robinson, Derck Massa, Glenn M. Wahlgren, Jozsef Vinko, & Laszlo Szabados.* 524, 379 (1999)

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The Origin of the Diversity of Type Ia Supernovae and the Environmental Effects. *Hideyuki Umeda, Ken'ichi Nomoto, Chiaki Kobayashi, Izumi Hachisu, & Mariko Kato.* 522, L43 (1999)

Direct Measurement of a Secular Pulsation Period Change in the Pulsating Hot Pre–White Dwarf PG 1159−035. *J. E. S. Costa, S. O. Kepler, & D. E. Winget.* 522, 973 (1999)

Stellar Masses, Kinematics, and White Dwarf Composition for Three Close DA+dMe Binaries. *Stéphane Vennes, John R. Thorstensen, & Elisha F. Polomski.* 523, 386 (1999)

Nucleosynthesis on ONeMg Novae: Models versus Observations to Constrain the Masses of ONeMg White Dwarfs and Their Envelopes. *Shinya Wanajo, Masa-aki Hashimoto, & Ken'ichi Nomoto.* 523, 409 (1999)

Constraining the Cosmic Abundance of Stellar Remnants with Multi-TeV Gamma Rays. *David S. Graff, Katherine Freese, Terry P. Walker, & Marc H. Pinsonneault.* 523, L77 (1999)

The D/H Ratio in Interstallar Gas toward G191−B2B. *M. S. Sahu, W. Landsman, F. C. Bruhweiler, T. R. Gull, C. A. Bowers, D. Lindler, K. Feggans, M. A. Barstow, I. Hubeny, & J. B. Holberg.* 523, L159 (1999)

A Very Low Luminosity, Very Cool, DC White Dwarf. *Hugh C. Harris, Conard C. Dahn, Frederick J. Vrba, Arne A. Henden, James Liebert, Gary D. Schmidt, & I. Neill Reid.* 524, 1000 (1999)

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Multiple Components in the Millimeter Emission of a Solar Flare. *J.-P. Raulin, S. M. White, M. R. Kundu, A. V. R. Silva, & K. Shibasaki.* 522, 547 (1999)

The Chromosphere in Coronal Holes and the Quiet-Sun Network: An He I (584 Å) Full-Disk Scan by SUMER/*SOHO*. *H. Peter.* 522, L77 (1999)

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Observation and Modeling of the Solar Transition Region. I. Multi-Spectral Solar Telescope Array Observations. *Hakeem M. Oluseyi, A. B. C. Walker II, Jason Porter, Richard B. Hoover, & Troy W. Barbee, Jr.* 524, 1105 (1999)

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Galaxy Clustering and Large-Scale Structure from $z = 0.2$ to $z = 0.5$ in Two Norris Redshift Surveys. *Todd A. Small, Chung-Pei Ma, Wallace L. W. Sargent, & Donald Hamilton.* 524, 31 (1999)

The *ASCA* Medium-Sensitivity Survey (The GIS Catalog Project): Source Counts and Evidence for Emerging Population of Hard Sources. *Yoshihiro Ueda, Tadayuki Takahashi, Yoshitaka Ishisaki, Takaya Ohashi, & Kazuo Makishima.* 524, L11 (1999)

New Galaxies Discovered in the First Blind H I Survey of the Centaurus A Group. *G. D. Banks, M. J. Disney, P. M. Knezek, H. Jerjen, D. G. Barnes, R. Bhatal, W. J. G. de Blok, P. J. Boyce, R. D. Ekers, K. C. Freeman, B. K. Gibson, P. A. Henning, V. Kilborn, B. Koribalski, R. C. Kraan-Korteweg, D. F. Malin, R. F. Minchin, J. R. Mould, T. Oosterloo, R. M. Price, M. E. Putman, S. D. Ryder, E. M. Sadler, L. Staveley-Smith, I. Stewart, F. Stootman, R. A. Vaile, R. L. Webster, & A. E. Wright.* 524, 612 (1999)

A Medium Survey of the Hard X-Ray Sky with *ASCA*. II. The Source's Broadband X-Ray Spectral Properties. *Roberto Della Ceca, GianMarco Castelli, Valentina Braito, Ilaria Cagnoni, & Tommaso Maccacaro.* 524, 674 (1999)

TECHNIQUES: IMAGE PROCESSING

The Brera Multiscale Wavelet *ROSAT* HRI Source Catalog. I. The Algorithm. *Davide Lazzati, Sergio Campana, Piero Rosati, Maria Rosa Panzera, & Gianpiero Tagliaferri.* 524, 414 (1999)

The Brera Multiscale Wavelet *ROSAT* HRI Source Catalog. II. Application to the HRI and First Results. *Sergio Campana, Davide Lazzati, Maria Rosa Panzera, & Gianpiero Tagliaferri.* 524, 423 (1999)

TECHNIQUES: INTERFEROMETRIC

Outburst in the Polarized Structure of the Compact Jet of 3C 454.3. *José-Louis Gómez, Alan P. Marscher, & Antonio Alberdi.* 522, 74 (1999)

The [N II] Kinematics of R Aquarii. *J. M. Hollis, S. N. Vogel, D. Van Buren, J. P. Strong, R. G. Lyon, & J. E. Dorband.* 522, 297 (1999)

Post-Newtonian Theory for Precision Doppler Measurements of Binary Star Orbits. *S. M. Kopeikin & L. M. Ozernoy.* 523, 771 (1999)

TECHNIQUES: SPECTROSCOPIC

An Upper Limit on the Reflected Light from the Planet Orbiting the Star τ Bootis. *David Charbonneau, Robert W. Noyes, Sylvain G. Korzennik, Peter Nihenson, Saurabh Jha, Steven S. Vogt, & Robert I. Kibrick.* 522, L145 (1999)

The Radial and Angular Variation of the Electron Density in the Solar Corona. *P. T. Gallagher, M. Mathioudakis, F. P. Keenan, K. J. H. Phillips, & K. Tsinganos.* 524, L133 (1999)

TURBULENCE

Two-dimensional Magnetohydrodynamics and Interstellar Plasma Turbulence. *Steven R. Spangler.* 522, 879 (1999)

On the Turbulent Velocity Dispersion in Molecular Clouds. *P. C. Myers & C. F. Gammie.* 522, L141 (1999)

Statistical Theory of Anisotropic Magnetohydrodynamic Turbulence: An Approach to Strong Shear Alfvén Turbulence by Direct-Interaction Approximation. *Kunji Nakayama.* 523, 315 (1999)

Coronal Heating by Magnetohydrodynamic Turbulence Driven by Reflected Low-Frequency Waves. *W. H. Matthaeus, G. P. Zank, S. Oughton, D. J. Mullan, & P. Dmitruk.* 523, L93 (1999)

Gravity Modes in ZZ Ceti Stars. III. Effects of Turbulent Dissipation. *Peter Goldreich & Yanqin Wu.* 523, 805 (1999)

The Energy Dissipation Rate of Supersonic, Magnetohydrodynamic Turbulence in Molecular Clouds. *Mordecai-Mark Mac Low.* 524, 169 (1999)

Small-Scale Interaction of Turbulence with Thermonuclear Flames in Type Ia Supernovae. *J. C. Niemeyer, W. K. Bushe, & G. R. Ruetsch.* 524, 290 (1999)

Turbulence in Stars. III. Unified Treatment of Diffusion, Convection, Semiconvection, Salt Fingers, and Differential Rotation. *V. M. Canuto.* 524, 311 (1999)

The Spectral Correlation Function: A New Tool for Analyzing Spectral Line Maps. *Erik W. Rosolowsky, Alyssa A. Goodman, David J. Wilner, & Jonathan P. Williams.* 524, 887 (1999)

Velocity Field Statistics in Star-forming Regions. I. Centroid Velocity Observations. *Mark S. Miesch, John Scalo, & John Bally.* 524, 895 (1999)

ULTRAVIOLET: GALAXIES

Hubble Space Telescope/Faint Object Spectrograph Spectroscopy of Spatially Resolved Narrow-Line Regions in the Seyfert 2 Galaxies NGC 2110 and NGC 5929. *Pierre Ferruit, Andrew S. Wilson, Mark Whittle, Chris Simpson, John S. Mulcahey, & Gary J. Ferland.* 523, 147 (1999)

NGC 3516: The Long-Term Variability of the Active Galactic Nucleus Emission-Line and Absorption-Line Regions. *M. R. Goad, A. P. Koratkar, J. Kim-Quijano, K. T. Korista, P. T. O'Brien, & D. J. Axon.* 524, 707 (1999)

ULTRAVIOLET: ISM

An Analysis of 17 Years of *Voyager* Observations of the Diffuse Far-Ultraviolet Radiation Field. *Jayant Murthy, Doyle Hall, Matthew Earl, R. C. Henry, & J. B. Holberg.* 522, 904 (1999)

The Abundance of Interstellar Tin and Cadmium. *Ulysses J. Sofia, David M. Meyer, & Jason A. Cardelli.* 522, L137 (1999)

The D/H Ratio in Interstallar Gas toward G191−B2B. *M. S. Sahu, W. Landsman, F. C. Bruhweiler, T. R. Gull, C. A. Bowers, D. Lindler, K. Feggans, M. A. Barstow, I. Hubeny, & J. B. Holberg.* 523, L159 (1999)

GHRS and *ORFEUS II* Observations of the Highly Ionized Interstellar Medium toward ESO 141−055. *Kenneth R. Sembach, Blair D. Savage, & Mark Hurwitz.* 524, 98 (1999)

ULTRAVIOLET: STARS

Spectroscopic Monitoring of the Be/X-Ray Pulsar X Persei/4U 0352+309 with the *ORFEUS*-SPAS II and the *IUE*. *Myron A. Smith & Paul Roche.* 522, 444 (1999)

Blue Straggler Stars: The Spectacular Population in M80. *Francesco R. Ferraro, Barbara Paltrinieri, Robert T. Rood, & Ben Dorman.* 522, 983 (1999)

Stellar Masses, Kinematics, and White Dwarf Composition for Three Close DA+dMe Binaries. *Stéphane Vennes, John R. Thorstensen, & Elisha F. Polomski.* 523, 386 (1999)

Toward an Orbit for the High-Luminosity Cepheid T Monocerotis. *Nancy Remage Evans, Kenneth Carpenter, Richard Robinson, Derck Massa, Glenn M. Wahlgren, Jozsef Vinko, & Laszlo Szabados.* 524, 379 (1999)

Abundances of the Elements in Sharp-lined Early-Type Stars from *IUE* High-Dispersion Spectrograms. II. The Nitrogen Deficiency in Mercury-Manganese Stars. *Scott W. Roby, David S. Leckrone, & Saul J. Adelman.* 524, 974 (1999)

WAVES

Deceleration by Dynamical Friction in a Gaseous Medium. *F. J. Sánchez-Salcedo & A. Brandenberg.* 522, L35 (1999)

Evolution of Nonlinear Alfvén Waves in Streaming Inhomogeneous Plasmas. *B. Buti, V. L. Galinski, V. I. Shevchenko, G. S. Lakhina, B. T. Tsurutani, B. E. Goldstein, P. Diamond, & M. V. Medvedev.* 523, 849 (1999)

The Thermal Starting Plume as an Acoustic Source. *Mark Peter Rast.* 524, 462 (1999)

X-RAYS: BURSTS

A New Bursting X-Ray Transient: SAX J1750.8−2900. *L. Natalucci, R. Cornelisse, A. Bazzano, M. Cocchi, P. Ubertini, J. Heise, J. J. M. in 't Zand, & E. Kuulkers.* 523, L45 (1999)

Spin-down of Pulsations in the Cooling Tail of an X-Ray Burst from 4U 1636−53. *Tod E. Strohmayer.* 523, L51 (1999)

Interpretation of ~35 Hz QPO in the Atoll Source 4U 1702−42 as a Low Branch of the Keplerian Oscillations under the Influence of the Coriolis Force. *Vladimir Osherovich & Lev Titarchuk.* 523, L73 (1999)

Observations of GRB 990123 by the *Compton Gamma Ray Observatory*. *M. S. Briggs, D. L. Band, R. M. Kippen, R. D. Preece, C. Kouveliotou, J. van Paradijs, G. H. Share, R. J. Murphy, S. M. Matz, A. Connors, C. Winkler, M. L. McConnell, J. M. Ryan, O. R. Williams, C. A. Young, B. Dingus, J. R. Catelli, & R. A. M. J. Wijers.* 524, 82 (1999)

Explosive Hydrogen Burning of ^{27}Si, ^{31}S, ^{35}Ar, and ^{39}Ca in Novae and X-Ray Bursts. *Christian Iliadis, Pieter M. Endt, Nikos Prantzos, & William J. Thompson.* 524, 434 (1999)

Variable Spin-down in the Soft Gamma Repeater SGR 1900+14 and Correlations with Burst Activity. *Peter M. Woods, Chryssa Kouveliotou, Jan van Paradijs, Mark H. Finger, Christopher Thompson, Robert C. Duncan, Kevin Hurley, Tod Strohmayer, Jean Swank, & Toshio Murakami.* 524, L55 (1999)

The Rapid Proton Process Ashes from Stable Nuclear Burning on an Accreting Neutron Star. *Hendrik Schatz, Lars Bildsten, Andrew Cumming, & Michael Wiescher.* 524, 1014 (1999)

X-RAYS: GALAXIES

Galaxy Cluster Shapes and Systematic Errors in H_0 Measured by the Sunyaev-Zeldovich Effect. *Martin E. Sulkanen.* 522, 59 (1999)

The Distribution of Absorbing Column Densities among Seyfert 2 Galaxies. *G. Risaliti, R. Maiolino, & M. Salvati.* 522, 157 (1999)

An *RXTE* Observation of NGC 6300: A New Bright Compton Reflection–dominated Seyfert 2 Galaxy. *Karen M. Leighly, Jules Halpern, Hisamitsu Awaki, Massimo Cappi, Shiro Ueno, & Joachim Siebert.* 522, 209 (1999)

A Multicloud Warm-Absorber Model for NGC 4051. *M. Contini & S. M. Viegas.* 523, 114 (1999)

An Ultradeep High-Resolution X-Ray Image of M101: The X-Ray Source Population in a Late-Type Spiral. *Q. Daniel Wang, Stefan Immler, & Wolfgang Pietsch.* 523, 121 (1999)

Hubble Space Telescope/Faint Object Spectrograph Spectroscopy of Spatially Resolved Narrow-Line Regions in the Seyfert 2 Galaxies NGC 2110 and NGC 5929. *Pierre Ferruit, Andrew S. Wilson, Mark Whittle, Chris Simpson, John S. Mulcahey, & Gary J. Ferland.* 523, 147 (1999)

The X-Ray, Optical, and Infrared Counterpart to GRB 980703. *P. M. Vreeswijk, T. J. Galama, A. Owens, T. Oosterbroek, T. R. Geballe, J. van Paradijs, P. J. Groot, C. Kouveliotou, T. Koshut, N. Tanvir, R. A. M. J. Wijers, E. Pian, E. Palazzi, F. Frontera, N. Masetti, C. Robinson, M. Briggs, J. J. M. in 't Zand, J. Heise, L. Piro, E. Costa, M. Feroci, L. A. Antonelli, K. Hurley, J. Greiner, D. A. Smith, A. M. Levine, Y. Lipkin, E. Leibowitz, C. Lidman, A. Pizzella, H. Böhnhardt, V. Doublier, S. Chaty, I. Smail, A. Blain, J. H. Hough, S. Young, & N. Suntzeff.* 523, 171 (1999)

The Blandford-Znajek Mechanism and the Emission from Isolated Accreting Black Holes. *Philip J. Armitage & Priyamvada Natarjan.* 523, L7 (1999)

X-Ray Spectral Variability of PKS 2005−489 during the Spectacular 1998 November Flare. *Eric S. Perlman, Greg Madejski, John T. Stocke, & Travis A. Rector.* 523, L11 (1999)

The Properties of the Relativistic Iron K-Line in NGC 3516. *K. Nandra, I. M. George, R. F. Mushotzky, T. J. Turner, & T. Yaqoob.* 523, L17 (1999)

The X-Ray Spectra and Spectral Variability of Intermediate-Type Seyfert Galaxies: *ASCA* Observations of NGC 4388 and ESO 103−G35. *Karl Forster, Karen M. Leighly, & Laura E. Kay.* 523, 521 (1999)

The Broad Fe K-Line Profile in NGC 4151. *Jun-Xian Wang, You-Yuan Zhou, & Ting-Gui Wang.* 523, L129 (1999)

Ω_m from the Temperature-Redshift Distribution of EMSS Clusters of Galaxies. *Megan Donahue & G. Mark Voit.* 523, L137 (1999)

The L_X-T and L_X-σ Relationships for Galaxy Clusters Revisited. *Xiang-Ping Wu, Yan-Jie Xue, & Li-Zhi Fang.* 524, 22 (1999)

A *ROSAT* Deep Survey of Four Small Gamma-Ray Burst Error Boxes. *K. Hurley, P. Li, M. Boer, T. Cline, G. J. Fishman, C. Meegan, C. Kouveliotou, J. Greiner, J. Laros, C. Luginbuhl, F. Vrba, T. Murakami, H. Pedersen, & J. van Paradijs.* 524, 92 (1999)

ROSAT HRI X-Ray Observations of the Open Globular Cluster NGC 288. *Craig L. Sarazin, Jimmy A. Irwin, Robert T. Rood, Francesco R. Ferraro, & Barbara Paltrinieri.* 524, 220 (1999)

The *ASCA* Medium-Sensitivity Survey (The GIS Catalog Project): Source Counts and Evidence for Emerging Population of Hard Sources. *Yoshihiro Ueda, Tadayuki Takahashi, Yoshitaka Ishisaki, Takaya Ohashi, & Kazuo Makishima.* 524, L11 (1999)

A Galaxy X-Ray Fundamental Plane? *M. Fukugita & P. J. E. Peebles.* 524, L31 (1999)

Temperature Variation in the Cluster of Galaxies Abell 115 Studied with *ASCA*. *R. Shibata, H. Honda, M. Ishida, T. Ohashi, & K. Yamashita.* 524, 603 (1999)

On X-Ray Variability in Seyfert Galaxies. *T. J. Turner, I. M. George, K. Nandra, & D. Turcan.* 524, 667 (1999)

A Medium Survey of the Hard X-Ray Sky with *ASCA*. II. The Source's Broadband X-Ray Spectral Properties. *Roberto Della Ceca, GianMarco Castelli, Valentina Braito, Ilaria Cagnoni, & Tommaso Maccacaro.* 524, 674 (1999)

The Nature of the Diffuse Clumps and the X-Ray Companion of Markarian 273. *X.-Y. Xia, S. Mao, H. Wu, X.-W. Liu, Y. Gao, Z.-G. Deng, & Z.-L. Zou.* 524, 746 (1999)

X-RAYS: GENERAL

Kilohertz Quasi-periodic Oscillations in Neutron Star Binaries Modeled as Keplerian Oscillations in a Rotating Frame of Reference. *Vladimir Osherovich & Lev Titarchuk.* 522, L113 (1999)

Discovery of 715 Second Pulsations from the Faint X-Ray Source AX J170006−4157. *Ken'ichi Torii, Mutsumi Sugizaki, Takayoshi Kohmura, Takao Endo, & Fumiaki Nagase.* 523, L65 (1999)

Spin-down of the 65 Millisecond X-Ray Pulsar in the Supernova Remnant G11.2−0.3. *Ken'ichi Torii, Hiroshi Tsunemi, Tadayasu Dotani, Kazuhisa Mitsuda, Nobuyuki Kawai, Kenzo Kinugasa, Yoshitaka Saito, & Shinpei Shibata.* 523, L69 (1999)

The Brera Multiscale Wavelet *ROSAT* HRI Source Catalog. I. The Algorithm. *Davide Lazzati, Sergio Campana, Piero Rosati, Maria Rosa Panzera, & Gianpiero Tagliaferri.* 524, 414 (1999)

The Brera Multiscale Wavelet *ROSAT* HRI Source Catalog. II. Application to the HRI and First Results. *Sergio Campana, Davide Lazzati, Maria Rosa Panzera, & Gianpiero Tagliaferri.* 524, 423 (1999)

X-RAYS: STARS

RXTE Observations of 0.1–300 Hz Quasi-periodic Oscillations in the Microquasar GRO J1655−40. *Ronald A. Remillard, Edward H. Morgan, Jeffrey E. McClintock, Charles D. Bailyn, & Jerome A. Orosz.* 522, 397 (1999)

Low-Luminosity States of the Black Hole Candidate GX 339−4. I. *ASCA* and Simultaneous Radio/*RXTE* Observations. *Jörn Wilms, Michael A. Nowak, James B. Dove, Robert P. Fender, & Tiziana Di Matteo.* 522, 460 (1999)

The Discovery of a 7–14 Hz Quasi-periodic Oscillation in the X-Ray Transient XTE J1806−246. *Rudy Wijnands & Michiel van der Klis.* 522, 965 (1999)

Where Is SGR 1806−20? *K. Hurley, C. Kouveliotou, T. Cline, E. Mazets, S. Golenetskii, D. D. Frederiks, & J. van Paradijs.* 523, L37 (1999)

Detection of Hard X-Rays from a Class I Protostar in the HH 24-26 Region in the Orion Molecular Cloud. *H. Ozawa, F. Nagase, Y. Ueda, T. Dotani, & M. Ishida.* 523, L81 (1999)

A *BeppoSAX* Study of the Pulsating Transient X0115+63: The First X-Ray Spectrum with Four Cyclotron Harmonic Features. *A. Santangelo, A. Segreto, S. Giarrusso, D. Dal Fiume, M. Orlandini, A. N. Parmar, T. Oosterbroek, T. Bulik, T. Mihara, S. Campana, G. L. Israel, & L. Stella.* 523, L85 (1999)

ROSAT HRI X-Ray Observations of the Open Globular Cluster NGC 288. *Craig L. Sarazin, Jimmy A. Irwin, Robert T. Rood, Francesco R. Ferraro, & Barbara Paltrinieri.* 524, 220 (1999)

A *Rossi X-Ray Timing Explorer* Observation of the Vela Pulsar: Filling in the X-Ray Gap. *M. S. Strickman, A. K. Harding, & O. C. de Jager.* 524, 373 (1999)

Simultaneous Radio and X-Ray Observations of the Wolf-Rayet Star WR 147. *Stephen L. Skinner, Masayuki Itoh, Fumiaki Nagase, & Svetozar A. Zhekov.* 524, 394 (1999)

Infrared Candidates for the Intense Galactic X-Ray Source GX 17+2. *Eric W. Deutsch, Bruce Margon, Scott F. Anderson, Stefanie Wachter, & W. M. Goss.* 524, 406 (1999)

Phase Lags of Quasi-periodic Oscillations in Microquasar GRS 1915+105. *Wei Cui.* 524, L59 (1999)

Correlations in the Quasi-periodic Oscillation Frequencies of Low-Mass X-Ray Binaries and the Relativistic Precession Model. *Luigi Stella, Mario Vietri, & Sharon M. Morsink.* 524, L63 (1999)

Recurrent X-Ray Emission Variations of η Carinae and the Binary Hypothesis. *K. Ishibashi, M. F. Corcoran, K. Davidson, J. H. Swank, R. Petre, S. A. Drake, A. Damineli, & S. White.* 524, 983 (1999)

On X-Ray Variability in Active Binary Stars. *Vinay Kashyap & Jeremy J. Drake.* 524, 988 (1999)

Scattering and Iron Fluorescence Revealed during Absorption Dips in Circinus X-1. *Robert E. Shirey, Alan M. Levine, & Hale V. Bradt.* 524, 1048 (1999)